Category 11, AP13 item 61

NUCLEAR REGULATORY COMMISSION

TECHNICAL REVIEW TEAM STAFF

Taken by: Carmen Gooden, CSR, RPR September 19, 1984

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M466

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

TECHNICAL REVIEW TEAM

TECHNICAL INTERVIEW

Wednesday, September 19, 1984
Eagle Mountain, Texas

This interview was commenced at 7:30 p.m.

PRESENT:

MR. DICK WESSMAN
Technical Review Team Staff
Nuclear Regulatory Commission
Washington, D. C. 20555

MR. PAUL CHEN
Technical Review Team Staff
Nuclear Regulatory Commission

[redacted]

MR. WESSMAN: For the record, this is an interview of [redacted] for the purpose of clarifying some technical activities at Comanche Peak Power Plant. It is a follow-up of an earlier interview that we did on August 2, 1984; however it does cover some different subjects than the August interview. The location of the interview is at [redacted] I'm not in Fort Worth, I'm [redacted]

MR. WESSMAN: [redacted] Present at the interview are myself, Dick Wessman, for the NRC Staff; Paul Chen, NCR Staff; and [redacted] As we've agreed, the interview is being transcribed.

The NRC has some questions in the areas of some welding activities out there and also some questions concerning work on the main steam pipe that occurred out there a couple of years ago.

Paul, if you would, let's pursue the other questions and then we'll come back to the main steam line questions.

MR. CHEN: I have some questions here related to some things that were mentioned in your [redacted]

MR. WESSMAN: This is [redacted]

[redacted]

MR. CHEN: In this [redacted] you mentioned a man that you tried to fire three times. You said that he was a general foreman on the night shift, and you implied that he was incompetent. Can you identify this man for us?

[redacted] No, I can't. It's been many, many moons.

MR. WESSMAN: [redacted] let me show you that [redacted] again, if I could, and see whether as you read the text of that whether anything comes to mind that might give us a little additional information on that. We're in the middle of page 6 of that document, I believe, and read, if you would, for a moment.

[redacted] All right. I know what I'm talking about now. I can't think of his name. His name is in one of my affidavits. Hollis.

MR. WESSMAN: H-o-l-l-i-s?

[redacted] Yeah, I think that's it; Hollis.

MR. CHEN: Is that his last name?

[redacted] Yeah, that's his last name. This is a man that I tried to fire numerous times. He done several things that were not up to standards. He done several things--the man was a scaffold builder. He built scaffold. He was a very--pardon my French, ma'am--piss-poor frame carpenter. I tried to fire this man on numerous occasions

because he was unqualified, did not know his work, could not read a blueprint. I been in steel most of my life. This man could not read a blueprint. He could not build anything to specs. Hollis Bogart.

MR. WESSMAN: His first name was Hollis?

[redacted] Hollis Bogart; Hollis Bogart was his name.

MR. WESSMAN: Do you recall an approximate timeframe that this fellow was working there?

[redacted] It was about--I imagine about a year before I got fired; that was on [redacted] It was about a year before that. This man wasn't qualified for nothing. He built some stuff for a Gold Hat, built a porch and so on, sun porch, and that's the only reason he had a job there.

MR. WESSMAN: Was this gentleman a Gold Hat?

[redacted] No, he was--well, he later wound up as a general foreman, which was next to a Gold Hat; but I've forgotten more than that man ever remembered.

MR. WESSMAN: Anyway, his name was Hollis Bogart, to your recollection.

[redacted] Right.

MR. WESSMAN: Okay. With that we ought to be able to pursue it via records at the plant. Go ahead.

MR. CHEN: The second question relates to something

that was mentioned in your sworn statement of June '83 in which you talked about torch cutting bolt holes in the back side of tube steel that would be used for anchor bolts.

[redacted] Right.

MR. CHEN: Was this a very common practice?

[redacted] Very common, especially with people that didn't know what they were dealing with.

MR. CHEN: Can you elaborate on that for us?

[redacted] Well, I tried to explain to you-all before that you have got a wall which a bolt is supposed to come out 90 degrees. These bolts are set in a pattern when they're poured in the concrete. They are not 90 degrees. There's no way. This Hollis Bogart was one of the characters that poured this concrete. It's easy to set up a form and say, "Here it is." When you go tying in precision steel where you're allowed an eighth and a sixteenth and a minimum, it don't work that way. This bolt comes out of the wall--we'll exaggerate just a minor fraction--at 45 degrees. If this bolt comes out at 45 degrees, you heat this bolt and turn it 90 degrees in order to fit a piece of six by six tube steel. When the inspector looks at it, he looks at it as it's coming straight through. All right. Hollis Bogart, which turned in to be a general foreman, cut holes four and five inches in diameter in a six-inch piece of tube steel in order to get the back part to go

through the front part.

MR. CHEN: I see.

[redacted] This I reported to my supervisors, and I was told, "Bob, don't look at it."

MR. CHEN: Given 100 supports, how many of those 100 would you say would have this problem?

[redacted] Fifty percent.

MR. CHEN: I just wanted to get a feel for it.

[redacted] Well, the concrete inserts were not put in the way they should have been. When you put a concrete insert in the wall--I don't know whether you ever poured any concrete or not--the concrete moves things up, down, sideways; and when you put in a tube steel that has to be flat up against the wall like so--okay?--if it's not flat, if it's cocked any way inside that wall--this, that, up, down--then you have got a piece of steel coming out here that's not 90 degrees; it's up, it's down, it's sideways, one side or the other. This is what Hollis Bogart caught, the back side of the steel which QC don't see, nobody can see because you have--in most cases you have a six by six one-inch plate with an inch-and-a-quarter hole in it. It goes against the wall, the tube steel goes up against it, and then it goes out through the tube steel; you have a one-inch plate up against the tube steel on the outside, then you have your nuts. So what do you see? You see a

nut and a bolt coming through a tube steel. You don't know what's behind it, you don't know what's in the middle of it, you don't know anything except what you're seeing.

MR. CHEN: Was this done in Unit One and Unit Two, or--

[redacted]: Unit One is the only one I worked in; I did not work in Unit Two.

MR. CHEN: Can you identify any hangers or areas or rooms where this condition might have--

[redacted]: I worked between 860 and 905. I had all of main steam; I had all of feed water, the main feed water in Reactor One.

MR. CHEN: Would this be all the main steam lines?

[redacted]: I had all the big main steam.

MR. CHEN: On all four loops?

[redacted]: No, just on 860--between 860 and 905.

MR. WESSMAN: In the Reactor Building itself?

[redacted]: Right.

MR. WESSMAN: Now, a minute ago you said you thought as many as 50 percent of these Richmond inserts--is that the proper term--were incorrectly installed. Are you talking about 50 percent of those that Hollis Bogart was involved in or 50 percent of all of those?

[redacted]: I'm talking about 50 percent of all Richmond inserts were installed improperly. I would say as much as that, because I was involved in feed water, I was

involved in safeguard, auxiliary, turban, and they were all the same.

MR. WESSMAN: Now, that's a large number, and obviously we're again stuck with trying to pin down some specifics like we've talked before, [redacted] I need some suggested areas where we go look. Obviously if we go pick ten and don't find any, we haven't looked in the right place possibly. Can you give us some suggestions of some real good examples if we have to go actually look for them?

[redacted]: Just between me and you, if you went and picked ten, eight of them wouldn't be wrong, on Richmond inserts. At an angle other than what, if I'm not mistaken, was six degrees, we were allowed out.

MR. WESSMAN: Let me be sure I understand you. You're saying normally the bolt should sit exactly straight out from the wall--

[redacted] Ninety degrees.

MR. WESSMAN: --90 degrees angle between the bolt and the wall. If it varies by more than six degrees in either direction--

[redacted] I think that's what we were allowed; I'm not real sure.

MR. WESSMAN: All right. If it varied by more than six degrees, you think it was out of specification then.

[redacted] According to specs that I was taught.

MR. WESSMAN: Your suggested place that we would look for examples is on this 860 to 905-foot levels of the Reactor Building where you had actually seen some of these that were incorrectly installed.

[redacted]: Well, I never actually seen the anchor installed incorrectly. I'm just saying when I screwed my-- when I screwed my anchor bolts into the walls, I would say eight out of ten were not within six degrees. We heated bolts, we put a nut on the end of a bolt, and took a sledge hammer and smacked it in order to make the 90 degrees so we would not have to burn or drill a hole oversized on the inside to allow for the outside to look good.

MR. WESSMAN: Are you saying that if we went and looked today, we would be very hardpressed to see whether any of them are out of spec or not?

[redacted]: Yes.

MR. WESSMAN: Because you heated them or pounded them with a hammer to bend them straight.

[redacted]: I would say eight out of ten of them.

MR. WESSMAN: Do you know whether there are any NCR's or documentation on the ones that were crooked?

[redacted]: No, because you got to realize you did not call an inspector until the actual hanger was up, and what that inspector saw was the finished product. He did not see how that bolt was put in there or whether it was

beat, heated or otherwise. What the inspector saw was the finished product with the plate behind it, the tube steel, the plate in front of it, and the actual torque of the plate.

MR. WESSMAN: I think in this earlier [redacted] you also talked about how they would sometimes cut the hole on the back side of the tube steel out so that it would fit a slightly crooked bolt. Would that evidence still be present?

[redacted]: On the actual ones that I found, no.

MR. WESSMAN: What happened?

[redacted]: I fixed them. I heated the bolt, I straightened it out; I beat the bolt, I straightened it out.

MR. WESSMAN: So you weren't involved in actually cutting these enlarged holes in the tube steel. You straightened the bolt instead of cutting holes in the back of the tube steel.

[redacted]: If I ever caught one of my men cutting a hole in the back of tube steel, I'd have fired him. There ain't no doubt in my mind.

MR. WESSMAN: Did you actually see some situations where these holes were cut in the back of the tube steel?

[redacted]: Yes, I seen--well, wait a minute. I seen the results of it. I did not actually see the tube

steel being cut, but I seen the results of it the next morning. Hollis Bogart was general foreman on nights. So when I pulled the particular hanger off, or hangers, that I'm talking about and you see a three-inch hole in a six-inch piece of tube steel, you report it to your Gold Hat, which was Raymond Hebert, and you're told to shut your mouth. This is what I'm talking about.

MR. WESSMAN: Raymond Hebert said this?

[redacted]: Yes.

MR. WESSMAN: Is that A-b-e-r-t or something?

[redacted]: No, it's H-e-b-e-r-t or something. He pronounces it A-bear. It's actually Hebert, but he pronounces it A-bear.

MR. CHEN: Are you saying that about 80 percent of all the Richmond inserts were outside the six percent tolerance?

[redacted]: Well, I would say if you checked eight out of ten you would find 50 to 80 percent out of the six percent--we were allowed six percent--or six degrees is what we were allowed, six degrees out of tolerance. Okay. You take a 90 degree wall and you go six degrees one way or the other, I would say, yeah, I would say 80 percent. There was no way that they were within six degrees.

MR. CHEN: Not all of these that were outside of this six-degree limit had holes enlarged in the back of the tube steel against the wall.

[redacted]: No.

MR. CHEN: What percent of the hangers that you were aware of had holes enlarged in the back of the tube steel?

[redacted]: That's hard to say for the simple fact that you don't know until you take one down.

MR. CHEN: Okay.

[redacted]: What I'm saying is-give me a piece of scratch paper there--

MR. WESSMAN: Let's go off the record for a minute while we're sketching and drawing.

(Off-the-record discussion held.)

MR. WESSMAN: While we were off the record, we were sketching a diagram of how the Richmond inserts were installed in the wall and how these holes in the back of a tube steel for pipe support would be invisible to an observer once the installation had been complete. Paul, go ahead with your questions.

MR. CHEN: Can you identify for us any hanger that has this problem that you are aware of?

[redacted]: Not really. Like I stated before, my shack had all the hangers that were wrong, but I've been gone for two years and there's no way--they have covered--you-all got one problem and I'll keep stating it and I'll keep stating it. You-all bring this stuff up, and you give them six months to correct it. Until you put a man out

there from you-all's organization and let him see what's going on--because I talk to guys every day. I talked to a guy last weekend. The same stuff is going on daily, and until you-all put a son-of-a-gun out there and find out what's going on, you ain't going to believe a damn thing I'm saying or anybody else is saying.

MR. WESSMAN: Are you saying right now we could probably see some of this sort of thing happening over in Unit Two--

[redacted] If you-all put somebody out there--Unit Two is a joke, man. Unit Two is a joke. I went over there and watched people do things that you wouldn't believe. Until you-all put somebody out there and see what's going on--because they'll hire anybody. They don't care what you are; they'll hire you.

MR. WESSMAN: Okay. Let's go on with the next question. If you've got anything more on the hangers--

MR. CHEN: This next question concerns your allegation that lugs were welded to stainless steel lines without purging with an inert gas. Can you give us any particulars such as the line number or support number or anything like that for us to--

[redacted] There's no way I can do it. I seen it done; I seen it done by the welding foreman out there, Joe Gray. I seen Joe Gray weld lugs on a line. In fact, I held the lugs on for him on 832 elevation on a stainless

steel pipe.

MR. WESSMAN: Any recollection of what system it was?

[redacted]: Man, there's no way. You're talking two years; I don't remember them systems.

MR. WESSMAN: Do you remember how big a pipe it was?

[redacted]: It was a three- or four-inch. I'm not real sure on that. It was a three- or four-inch line on 832 elevation, which Roy Estes was in charge of. He had a bunch of lugs that were down there that were malfunction and the whole bit. We covered them up with Joe Gray welding because I held the lugs on for him.

MR. WESSMAN: Was this shortly before you were terminated out there? Do you remember the approximate timeframe?

[redacted]: I don't remember the time; I don't.

MR. WESSMAN: Any other suggestions for us on the welding of lugs that we might look at to try to find some individuals or timeframes or any unusual incidents that might come to mind, or an NCR that was filed that might help us find something?

[redacted]: I can't. I wish I could. I wish I could name dates and everything else, but I can't do it.

MR. CHEN: You mentioned a few minutes ago that from some of your friends that some of the kinds of activities that you're telling us about is going on in Unit Two. Is

this the kind of thing that's going on now in Unit Two?

[redacted]: Yes; yes, it is. It's the same thing. You've got people that are unqualified doing Unit Two. You've got rebar people, form people, and it's been--the man in charge of Unit Two when I left there was a man that stated--and I stated it to him before--was a man that looked at one of my blueprints on the main steam hanger and said, "Man, I don't understand how you can even do anything like that," and two weeks later he was a general foreman over Unit Two in pipe supports. This is the type of people you got out there. You got the same people out there that was out there two years ago. They are unqualified. There's no way in hell that they're qualified to put up a pipe support or any kind of steel support.

MR. CHEN: I have no further questions in that area unless you do.

MR. WESSMAN: No, I don't. Let's pursue your questions on the main steam line.

MR. CHEN: I was looking through your [redacted] and some of the interviews that were conducted with you on this business about relocating the main steam lines. I'd like to get as much information as I can from you in order to be able to investigate what happened. Tell me, this is the main steam line in Unit One; is that correct?

[redacted]: Yes.

MR. CHEN: Can you describe for me a little bit what the configuration was? Was the main steam line completely installed at the time that this was done?

[redacted]: The only thing I can do is draw you a picture.

MR. WESSMAN: Let's go off the record and let's draw a sketch of what went on.

(Off-the-record discussion held.)

MR. WESSMAN: While we were off the record, we developed a couple of sketches of the configuration of the main steam line installation showing where the permanent line was located and the permanent hangers that Mr. Messerly was involved in the installation of. We've also identified where a temporary connection near the steam generator was made for flushing purposes. Go ahead from there with your questions, and let's describe where this line moved when they cut it again, if you would [redacted]

[redacted]: Well, the line was moved six to twelve inches from when they cut it loose. I was there; I witnessed it. My general foreman told me to get my people off that floor on account of the whip restraint the steel has, and get them off that floor between 860 and 905. There was also a Gold Hat there that had the polar crane tied to the top of this to pull it into position.

MR. CHEN: Just a moment. Can I point out at this

point that [redacted] pointed at the junction between the 32-inch main steam line and the smaller diameter flushing line. Go ahead.

[redacted]: And my general foreman told me to leave the floor and get all my people off the floor on account of the strain that pipe was in.

MR. CHEN: I believe you stated in [redacted] that the line, the main steam line, was off six inches vertically and four inches horizontally.

[redacted]: Right.

MR. CHEN: What was the source of that information?

[redacted]: The source of the information was the pipe people themselves, and a man was down there with a come-along pulling this thing over in position. Ron McBee was the foreman on pipe that made this change. I can't remember the general foreman. Ron McBee was the man that caused this. They took come-alongs and they took the overhead polar crane and pulled this thing into position. The tonnage was something like 40 or 50 ton to pull this thing into position after it was cut. We had to move approximately four hangers, which I can take you out there and show you right now, that were moved.

MR. CHEN: Were these hangers on the main steam line?

[redacted] These hangers were on that steam line, on that expansion joint, that we had to move because they

were out of location. I'm talking about a hanger that we spent three or four weeks on just welding up.

MR. CHEN: Did you happen to see which hook on the polar crane was used during this operation?

[redacted]: The big one.

MR. WESSMAN: How did you know it was about 40 tons on the polar crane?

[redacted]: They had a gauge on it.

MR. WESSMAN: And you were able to see the gauge?

[redacted]: They had a gauge on it, a round gauge; it showed the tonnage pull.

MR. WESSMAN: This is a gauge--it must be a large gauge that's visible to people standing on the floor.

[redacted]: It's, oh, 24 inches in diameter; or bigger; or smaller; I really don't know.

MR. WESSMAN: I understand.

MR. CHEN: Let me clarify--get something straight. In some of your documents that I have reviewed, it indicates that you've said the load might have been as high as 85 tons.

[redacted]: I really don't know what tonnage it was. I'm just guessing. I'll just put it to you this way: I've been in steel all my life, and you don't pull steel in tonnage and expect it to hold. This was also done by a man that was fired by another man five years prior to Comanche

Peak, because he was incompetent; the Gold Hat of the Pipe Department out there right now.

MR. CHEN: I'm a little bit confused because I think in some of the documents and affidavits you mentioned temporary supports. Now you're saying that they're permanent supports. Can you show me on this sketch roughly where these supports were?

[redacted] No, I'd have to go out there and show you. I'd have to go out there and show you permanent supports, the ones we moved, the ones we had to move, and the whole bit. See, they have--they got a spring load support, you got a support that keeps from going longitude and latitude, and you have all these kinds of supports. The support that we had to move on account of the pipe being in the wrong place when they put the polar crane on it, we had to completely revise that; we had to completely rebuild that. Charlie Copeland fired the Gold Hat that was in charge of pipe four or five years prior to Comanche Peak because he was incompetent, and this was a Gold Hat out there. I can't remember his name now; I wish I could.

MR. CHEN: He fired him on some other job other than Comanche Peak?

[redacted] Right; for incompetence.

MR. CHEN: How much adjustments did you make in the hangers? Can you remember that?

[redacted]: What do you mean by adjustments?

MR. WESSMAN: You had to move several hangers. Did you move them like three or four inches or are we talking a relocation that may involve several feet, or just--

[redacted]: No, we're talking anywhere from three inches to ten inches to a foot, after the pipe was through the concrete; and you don't put a bind on steel like that.

MR. CHEN: Can you tell me how many come-alongs were used?

[redacted]: About four.

MR. CHEN: Do you know what capacity these come-alongs were?

[redacted]: I did, but it's been a while. But they had a guy out there named Rex Broom that would make four of me and you combined, and he put an eight-foot cheater on the come-alongs to pull this pipe, and I'm talking about an expansion chamber, into position. If you think I'm kidding you, go out there and talk to Rex Broom.

MR. WESSMAN: I'm not too good on come-alongs. Are there standard sizes, like one ton--

[redacted]: --two ton, three ton, four ton, five ton; but you put a cheater on them and you can get a lot more.

MR. WESSMAN: Were the come-alongs being used likely to be four or five tons or one or two tons?

[redacted]: I'd say four or five ton.

MR. WESSMAN: Okay.

[redacted]: With eight-, ten-, twelve-foot cheater. As I told you before, go out there and see Rex Broom.

MR. CHEN: Just to be sure I understand what is contained in some of these affidavits, you said the lift was supervised by a Gold Hat, but there were no engineers anywhere around.

[redacted]: There was not an engineer nowhere. I don't give a damn what they say. There was none, because my general foreman told me to get my people off the floor; there was no engineers; he didn't know where that pipe was going, and he didn't want none of his people hurt.

MR. WESSMAN: When this pipe made its move, this was while they were pulling on it and they were making the cut at the joint in the generator; so there was one guy down there finishing the cut, and as he finished the cut, the thing popped and moved; is that right?

[redacted]: That's how far it was out of stress; right.

MR. CHEN: Are you aware or have you heard of similar incidents on the main steam line?

[redacted]: No, not really. I can't say I do. All I know is what happened in Reactor One, Containment One. I was there; I was there on everything.

MR. WESSMAN: Do you know whether they ever did this on any other main steam lines out there?

[redacted]: No, I don't. I can't say that they did or didn't.

MR. WESSMAN: Do you know whether they ever did it on a feed line or any other of the big lines out there?

[redacted]: No, I do not. I went over in Reactor Two and seen the results of what they did with the polar crane pulling the feed water and the main steam lines because the pipe hangers wouldn't fit; and the welding was wrong and so forth and so on. But that's all I can say.

MR. WESSMAN: They had to do some similar pulls like this in Reactor Two?

[redacted]: You got to understand what took over Reactor Two: Rebar people, concrete people, people who are used to building forms; they do not know nothing about steel. They do not know nothing about the stress of it, about the tolerance of it, or anything else. This is what you got to realize. It's all a clique; they're all from South Carolina, North Carolina; and they all come up there on the same deal. It's the same deal with the general foreman that did not know nothing about blueprints that I was doing, and two weeks later he wound up as a general foreman over pipe support.

MR. WESSMAN: Were you working any hangers in Reactor

Two where you would have seen any of this?

[redacted]: I have not done nothing in Reactor Two, nothing in Containment and Reactor, other than a few pipe supports in two-inch and under. That's all I've done in Reactor Two, Containment Two, or anything to do with Two.

MR. CHEN: Let me just try and clarify in my own mind exactly what you're saying. You're saying that this line was in place; it was cut here, and that was where the flopping of the piping occurred, and then the pipe was lifted.

[redacted]: Right.

MR. CHEN: While it was lifted you had to go back and undo some of your hangers and--

[redacted]: Approximately five, six hangers I had to redo completely.

MR. CHEN: I have no other questions.

MR. WESSMAN: Was this all done in one overnight shift, or was this a several-day period this--

[redacted]: No, it was a several day, because one of the hangers we had to air arc completely off of whip restraints and redo completely.

MR. WESSMAN: Anything else you can think of to share with us on this? I know you've talked this subject before with the NRC.

[redacted]: No, not really; just that it was done;

I was an eye witness at it. I'll swear to it in anybody's court.

MR. WESSMAN: Okay, Paul, you have no other questions; is that correct?

MR. CHEN: No.

MR. WESSMAN: As before, have you given all your statements to us freely and voluntarily, [redacted]: I have.

MR. WESSMAN: Okay. We thank you for your time.

CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the Nuclear Regulatory Commission

In the Matter of: COMANCHE PEAK, TECHNICAL INTERVIEW

Date of Proceedings: September 19, 1984

Place of Proceedings: [redacted]

were held as herein appears, and that this is the original transcript for the file of the Commission.

Carmen Gooden
Certified Shorthand Reporter

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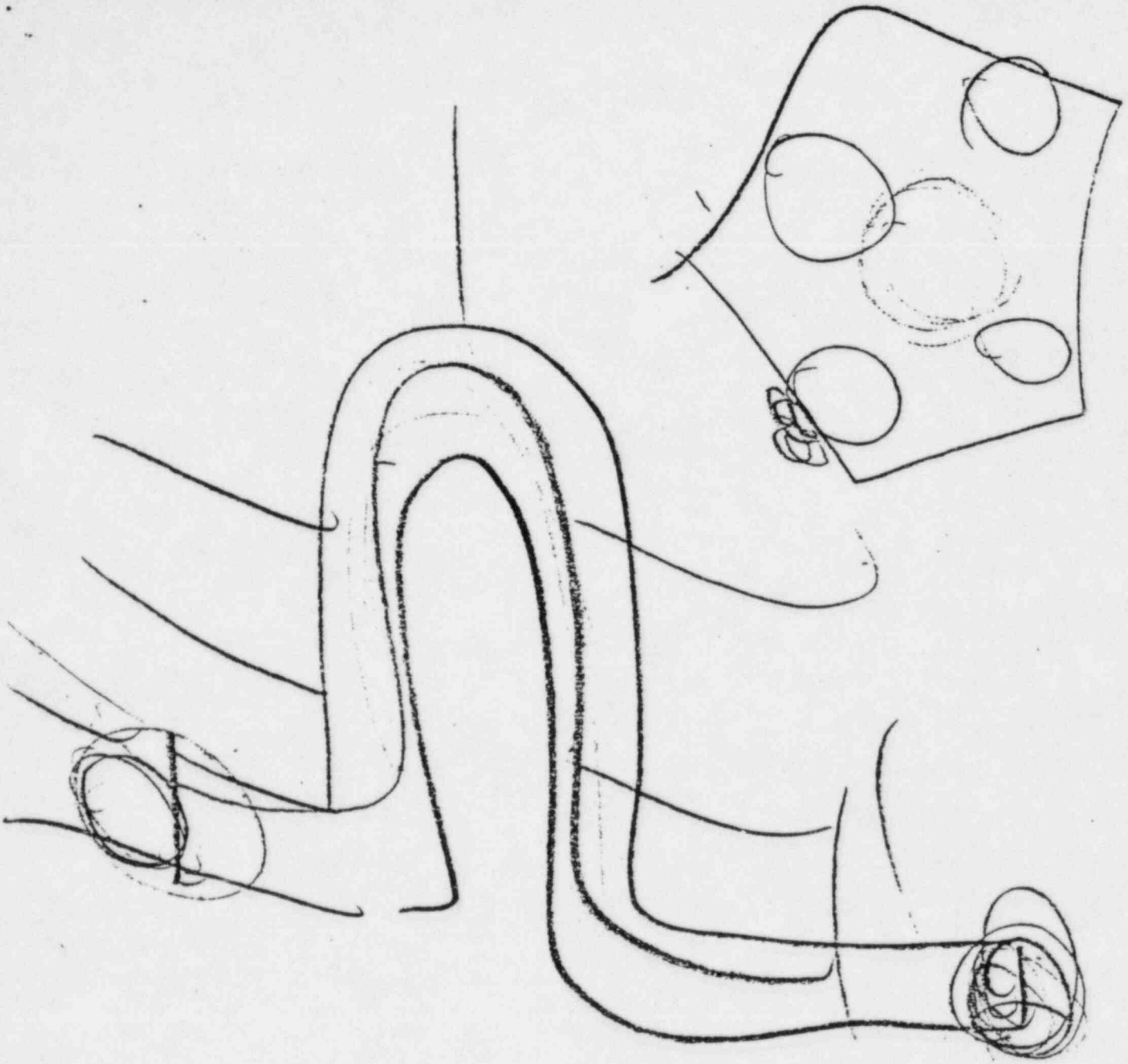
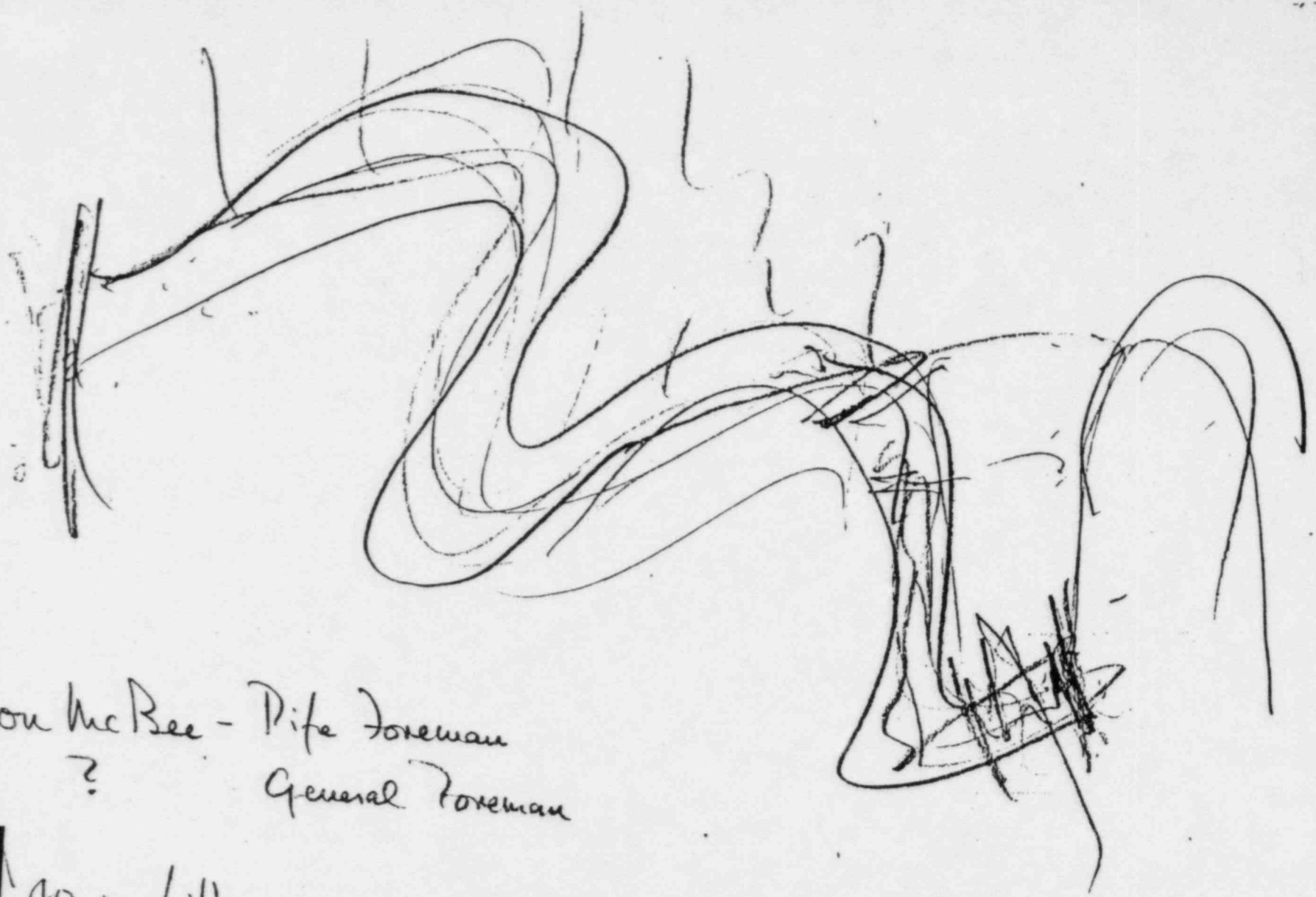
Certified Shorthand Reporter





Ron McBee - Pipe Foreman
?
General Foreman

[redacted]

40 or fifty

7C

Notes related to [redacted] Interview
Sept 19, 1984

2
- Was the main steam line located in Unit 1 ✓
- Was the main steam line completely installed and attached at the wall and the steam generator
- Where was the temporary line attached to the main steam line. How was the temporary line supported at its other end

3
- Did you state that after installation it was discovered that the main steam line was mislocated 6 in. vertically and 4 in. horizontally.
- How did you know how much the line had been mislocated?

4
- Did you state that movement of the line was necessary because it did'nt fit?
- What did you mean when you said it did'nt fit?

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5
- Did you state that the polar crane and 3 ton come alongs were used to force the pipe into position?
- Do you know how many hooks there are on the polar crane? (rigging)
- Do you know which hook was used in the lifting operation? used or where located?
- Do you know how many come alongs were
- Did you state that the main steam line was lifted at the "expansion chamber"

6
- Can you identify the "expansion chamber"

7
- Did you say the pipe was forced ~~6~~ 6 in. up vertically & 4 in. horizontally
- How did you know that these were the movements

8
- Did you state that the force was several tons or 85 tons
- How did you know what force was applied?
- Where were you located during the ope

9) where was the big round gage?

10) what temporary supports had to be removed

what hangers

(c) AP-13. A review of various affidavits and testimony by the allegor was made to obtain as much information regarding the allegation that a 32 in main steam pipe was forced into position with the polar crane and 3 ton come-alongs. The information obtained from the review was as follows:

(1) The incident occurred in the "summer of '82", the year in which he had been hired, or earlier.

(2) During this operation the main steam line had been installed with one end anchored at a wall and the other attached to the steam generator.

(2) The main steam line had been installed with one end anchored at a wall and the other end temporarily welded to the steam generator with temporary

(3) After installation it was discovered that the line had been misliocated 6 in. vertically and 4 in. horizontally.

(4) Movement of pipe was necessary "... because it did'nt fit. ...

(5) The pipe was forced into position using the polar crane and 3 ton come-alongs

(6) The pipe was "moved" at the "expansion chamber".

(7) The pipe was forced "... 6 in. up vertically and 4 in. horizontally ...".

(8) The force exerted by the polar crane was variously described as "several tons, 85 tons and unknown (the allegor said: "... I can't remember the exact tonnage ..."

(9) The force exerted was indicated on a ... "a big round gauge (that) looks like (a) big clock ...

860
905

hangers (supports)

(10) unspecified temporary pipe, which had been installed prior to movement of the pipe had to removed during movement of the pipe. The hangers (supports) were installed after movement of the pipe "... in order to hold it ..." ~~Several supports~~

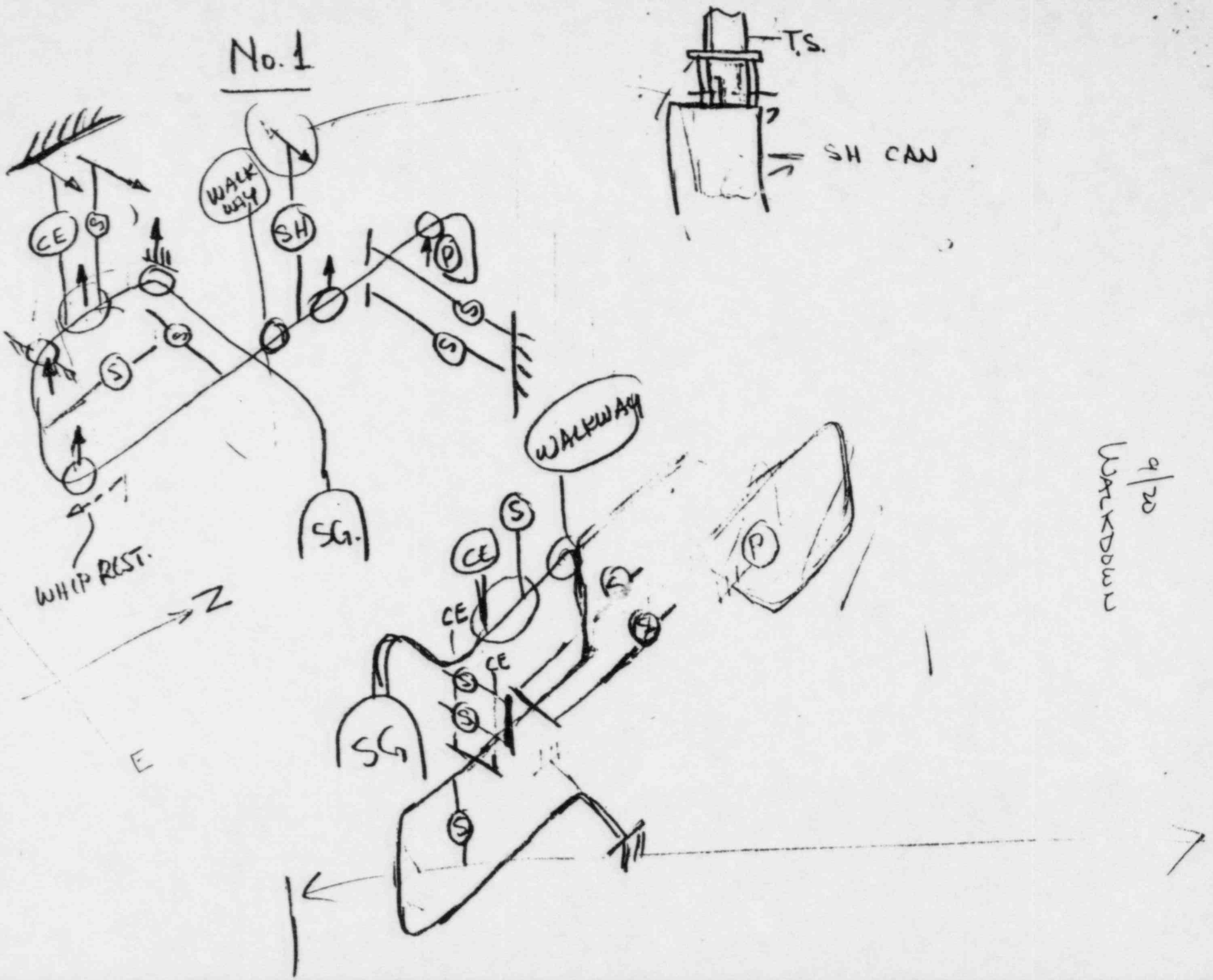
(11) Several unspecified supports could not be used after movement of the pipe. These supports were removed and "... redesigned to move over to the center of the pipe ..." presumably since the allowable "... degrees for any pipe hangers to be off of dead center of that thirty-two inch main steam pipe ..." had been exceeded."

~~Further information obtained during an interview with the alleger was that:~~

~~(1)~~

(12) the lift was supervised by a gold hat, ~~the~~ vs (there wasn't any engineer anywhere around

(13) When they cut the temporary hookup to the S/G loose it flopped like 14 in & echoed through the whole containment building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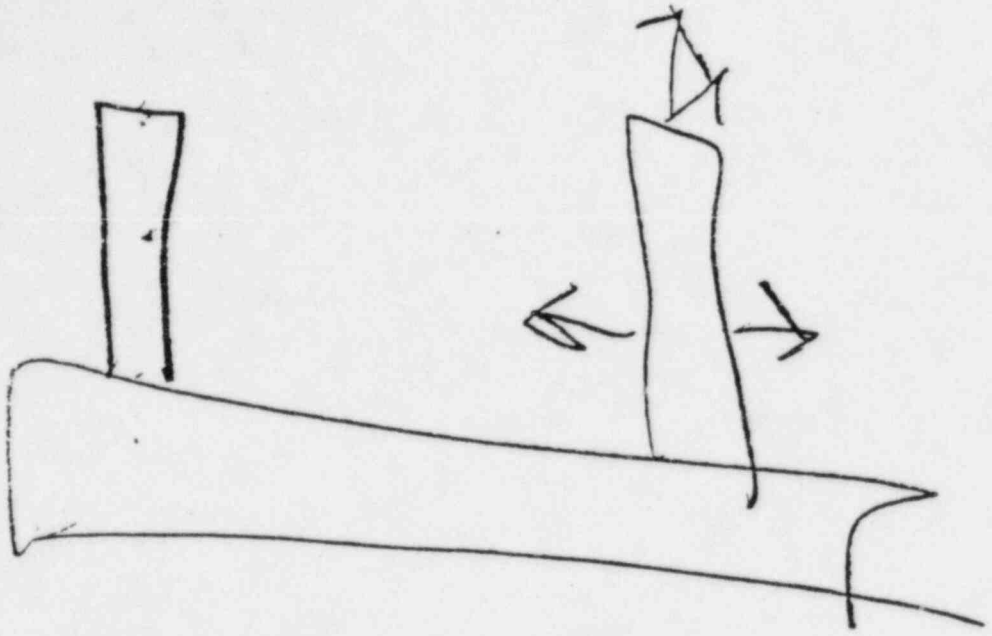

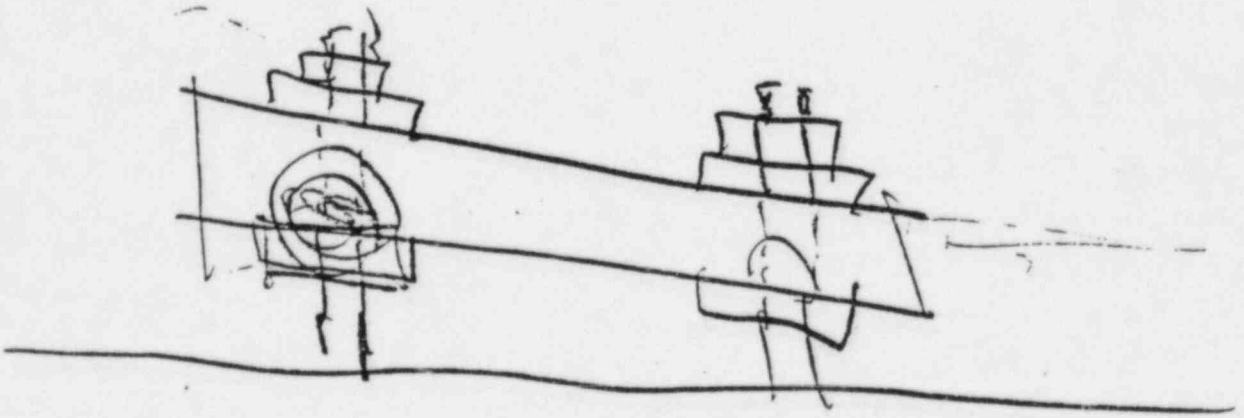

[redacted] INTERV.

AW-45

Q Concerning your allegation that lugs were welded to stainless steel lines without purging with an inert gas (Argon). Can you give me any particulars such as line number, support number, pipe size or pipe wall thickness?

No. Joe Gray did some. { 832 EL SS 1in/2 in. 3 in or 4 in line }

{ Roy Estes (?) were in charge }

Q Is there any other information that you think may be helpful to me in my review of this particular allegation on welding lugs on stainless lines without proper purging.

QUESTIONS FOR [redacted]

AH-10

PAGE 1 of 7

1) IN YOUR AFFIDAVIT OF 2/3/83 BEFORE THE ASLB YOU TALK ABOUT A MAN YOU TRIED TO FIRE THREE TIMES, HE WAS A GENERAL FOREMAN ON THE NIGHT SHIFT. YOU IMPLIED THAT HE WAS INCOMPETENT. CAN YOU IDENTIFY THIS MAN who he would not identify was [redacted] a year in Dec. 1981 PAGES 35, 36 + 49

2) IN YOUR SWORN STATEMENT OF 6/18/83 YOU TALK ABOUT TORCH CUTTING THE BOLT HOLES IN THE BACKSIDE OF TUBE STEEL THAT WOULD THEN BE USED WITH ANCHOR BOLTS.

a) WAS THIS A COMMON PRACTICE
very common 50%.

b) WAS IT DONE ON UNIT 1 & UNIT 2
UNIT

c) CAN YOU IDENTIFY ANY HANGERS BY MARK NO, ISO-METRIC, AREA, ROOM, ETC THAT HAVE THIS CONDITION.

860 905
M/S F/W ~~S/G~~ AUX TURBINE
SAFEGUARD.

6° Is MAX ALLOW ~~DEV~~. DEVIATION FROM 90°.
- BOLTS WERE HEATED
- NUTS PUT ON BOLTS & HIT ~~IT~~ WITH SLEDGE HAMMER
-

you recall ever having seen that posted at Comanche Peak?

A: No, I don't. You've got bulletin boards in front of the main tool room, one on the turbine deck, and one in the Administration Building. I had access as a Foreman to all of them, and I don't remember ever seeing it.

I don't know what can be done about the waste, the materials, and the back-stabbing that goes on at Comanche Peak. There are $100 plus per Hilti bolt that are scrapped daily by the skip pan full. There's wood, lumber, steel, and what it's costing the taxpayers, it's ungodly. There's no reason for it. It's ridiculous, it's the misfits, it's the supervision you've got out there. For instance, the general foreman on nights built a gold hat a sun deck or porch on his house. I tried to fire this man three times but I couldn't do it; they wouldn't let me do it because he'd been out there five or six years, and he was a good ole boy. I tried to fire him three times for inadequate work. He could not handle his position. And here they were paying him $14 or more an hour. Now this man is a general foreman, underneath a gold hat, in charge of pipe hangers on nights. The man is uncualified, incompetent, can't do his work. He's cut holes in hangers where if there were any kind of vibration the hanger would fall off the wall; he used a cutting torch, and you're not allowed to use a cutting torch on any kind of material out there on a pipe hanger unless it is done in the Fab Shop under QA supervision. Well, he cut holes in them so that sometimes he couldn't even figure out his holes, he couldn't figure out the tolerances or anything. And this man is now a general foreman on nights on big bore pipe hangers.

AH-16 — AH-10 AH-9 relies

I can tell you lots of things. I was a supervisor for four years out there. Let me just give you a general perception of what's going on there.

[redacted]

I've been in steel work all my life -- I've been a fabricator, I've supervised a shop, and the whole bit. You've got people out there who do rebar tying. You've got two pieces of steel to tie together with a piece of wire. This is rebar people, all right? All they've got to do is to go up there and tie the rebar, and pour the concrete around it. It's all a hidden object, right? This entire rebar organization and building department has come into pipe hangers. The entire rebar staff out there is a kind of clique, and they went into the hanger department. They suddenly became hanger geniuses. There's one man out there right now who, three weeks before he was transferred from scaffold and rebar said, "Man, I don't know how in the hell you read these blueprints -- I don't know how in the hell you can make these things (pipe hangers)." And as God is my witness, three weeks later this man was a General Foreman over pipe hangers. He was a general foreman next to a gold hat over pipe hangers. He suddenly knew all about pipe hangers. He suddenly knew all about steel. And here was a man that has done nothing but concrete and rebar all his life. But all of a sudden he is a steel genius because he is in the clique, because he belongs to the building department out there, because he is one of [redacted] little boys.

There's jokes floating all over that plant where they show a pipe hanger tied together with wire or nailed together with wood because of the carpenters and rebar hands that came over into pipe hangers. They're coming over as foreman, they're coming over as General Foreman and they're coming over as gold hats (superintendents). And all of a sudden they know everything about pipe hangers and about steel.

I'm just fed up with it, cause I've got to live here. I was here before

[redacted]

1C Category 11 AP13 Item 67

On February 10, 1983, Messrs. Tony Vega and David Chapman contacted [redacted] in an effort to obtain additional information relevant to his allegations stated in his affidavit dated February 3, 1983.

[redacted] stated he had drilled more than six (6) holes without the proper engineering documentation. He stated he had a log of the locations he had drilled. We asked him for a copy of this information so that we could investigate these items. We advised him he had a responsibility to provide us with this information under the Atomic Energy Act. He refused and told us he was not obligated to us but was "obligated to someone else."

[redacted] suggested we contact several people on site to get additional information on improper drilling activities, but stated the information that anyone else could provide would be "hearsay," stating that he was the only person who had first hand knowledge.

[redacted] stated he also knew of one unauthorized modification to a hanger where, in driling a hole for a Hilti bolt and hitting rebar, the Hilti bolt was cut and welded to the back of the base plate and installed.

In regard to the 32-inch main steam line, [redacted] provided the names of the personnel involved in the movement of the Unit 1, main steam Loop 1 line.

[redacted] also mentioned a 4-inch pipe that "caved-in" in the Unit 1 Safeguards Tunnel, but would not provide additional details.

The above matters were investigated at the CPSES site starting Febrary 14, 1983 by Messrs. Vega and Chapman. The persons that [redacted] mentioned as having knowledge of these activities were interviewed with the following

M468

results.

In regard to the alleged drilling activities, none of the persons interviewed could substantiate [redacted] allegation on improper drilling activity or provide any information that would allow further investigation of improper drilling activities. In the absence of specific information, no further action is appropriate.

In regard to the unauthorized modification, two persons named by [redacted] had observed the hanger part first hand. One person observed it when he attended a meeting in Mr. James Callicutt's office approximately two years ago. He was advised that this item had been found in the Turbine Building, uninstalled, lying on the floor. He stated that he knew of an investigation that had been conducted where installed Hilti bolts were ultrasonically tested to verify that their actual length was consistent with the length code stamped on the exposed end of the Hilti bolts.

The second person with knowledge of the unauthorized modification was the person who removed the welded Hilti bolt and returned the hanger to its approved configuration. This person stated that he knew that [redacted] had worked on the hanger prior to it being identified as deficient, but stated he did not see [redacted] cut and weld the Hilti bolt to the back of the plate.

The ultrasonic examination program to which the first person interviewed was referring, is that described by the Applicants on July 20, 1982. Tr. 1739-1757. On this basis, we have concluded that no further action is necessary.

The movement of the 32-inch main steam line mentioned by [redacted] was investigated. The subject line is MS-1-RB-002 (loop 1). The activity was

discussed with both craft personnel involved in the movement and cognizant engineering personnel. The line was moved on January 16, 1982 under the supervision of the Field Mechanical Engineering Group, and was witnessed by designated representatives. A dynamometer, serial number MTE 357, was used at all times to measure lifting force. An engineering representative witnessed and signed-off the proper calibration status, installation and use of the dynamometer throughout the operation. The applied forces are recorded on proper documentation. The line was lifted 3-1/2 inches and moved 5 inches in a northerly direction under engineering supervision. The line is, by design, a highly flexible line, and is considered an expansion system to allow for movement during operation. The line is also supported by spring hangers to allow for this movement. The lifting points were consistent with the hanger locations to simulate the permanent support system. The as built configuration has undergone stress analysis and the acceptability of the line confirmed. Accordingly, no further action is appropriate.

An effort was made to identify the "4-inch caved-in pipe" in the Unit 1 Safeguards Tunnel. No such pipe was found. In the absence of more detailed information, no further action is appropriate.

The investigation failed to identify any deficiencies or improprieties.

Antonio Vega

Category II, AP13, item 1

Note 2

When the requirements of NOTE 1 can not be met, the welds including the adjacent base material for at least 1/2 inch on each side of the weld shall be examined by either MP or LP.

Note 3

In addition, the adjacent base metal for at least 1/2 inch on each side of the joint shall be included in the examination.

7.11 ADJUSTMENT OF HANGERS

7.11.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.11.2 Adjustment Prior to Testing and Flushing

After erection of each piping system and prior to hydrostatic testing or flushing, the Contractor shall inspect all hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, freedom of rods to swing and guides to permit movement without binding, and adequacy of all anchors. All threaded components shall be carefully inspected to assure full thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. Rigid supports of the trapeze type shall be thoroughly inspected to determine that the total load is equally distributed between the rods. Deflecton of support steel, as designated by the Engineer, shall be measured and recorded prior to cold springing or filling any piping system with water.

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7.11.3 Hanger Adjustment for Pipe System Operation 5779

7.11.3.1 5781

After completion of final welds, hydrostatic testing and 5783
preservice inspection according to ASME Section XI, flushing, and
application of insulation, each piping system shall be thoroughly 5784
drained. Lines carrying steam, gas, or air shall remain dry 5785
after travel stops are removed; other lines shall be filled with
their transported medium prior to removal of travel stops.
Caution-The Contractor shall not permit sudden pipe drops when 5786
removing travel stops; chain falls or other lowering provisions
shall be employed as necessary. After removal of stops, all 5787
springs shall be adjusted for the design cold load and cold
position and loads, and positions shall be accurately recorded on
forms suitable to the Owner. Owner's personnel will perform the 5788
functions described in paragraphs 7.11.3.3 through 7.11.3.6, and
the Contractor shall assist in this work as requested by the
Owner.

7.11.3.2 5790

Should spring adjustment exceed the visible load scale or travel 5792
range, the Owner shall be notified at once for disposition of the
problem, and the piping system involved shall be blocked out of 5793
service until subsequent resolution of the matter.

7.11.3.3 5795

When each piping system is filled or put into service, the 5797
Contractor shall provide sufficient personnel to observe the
suitability of all supports under operating loads and 5798
temperatures. During the heating up of all systems operating 5799
excess of 200 F, the Contractor shall take accurate measurements
of the piping movements at a sufficient number of points to
assure that the supports are operating as designed; and, if in 5800
doubt, shall stop any further heating until approval by the Owner
to resume is received. The foregoing applies to hot functional 5801
testing.

7.11.3.4

During this period, all spring hangers and seismic restraints shall be inspected for travel and load changes and all sliding supports, rods, and guides shall be inspected for binding.

7.11.3.5

When each system has attained its operatiq temperature, the Contractor shall record th hot load and travel position for the spring supports and shall readjust the hot position only after notifying the Owner of the variation between the existing hot condition and the design hot condition. Should travel cr load ranges exceed the specified allowance, the Contractor shall replace supports as directed by the Owner.

7.11.3.6

During Owner's testing of safety valves, turbine trip valves, and other items causing impact or shock loads on the piping systems, the Contractor when directed by the Owner, shall inspect snubbers, sway braces, thrust restraints and seismic restraints. All piping systems exhibiting pulsation, vibration, swaying, or impact must be provided with suitable constraits to correct this condition. Movements resulting from trap discharge, flashing mixtures, water hammer, and similar internal forces shall be included within this requirement. No system will be accepted until the adequacy and safety of the system is assured under all anticipated conditions of operation.

7.11.3.7

When making final pipe alignment within the allowable tolerance range, the supports shall be adjusted tc permit proper drainage of the pipe in the hot operating condition, to limit the sag and tc avoid excessive bending stresses due to weight of the valves, risers, or other load concentrations acting between the supports. Provision shall be made for proper support of piping which may be disconnected during cleaning, flushing or maintenance work.

7.11.3.8 5829

All temporary attachments and devices used in installing the Work 5831
shall be removed from the work areas prior to pipe system
turnover to the Owner. 5832

7.12 TEMPORARY HANGERS 5834

To minimize risk of personnel or equipment injury or damage, all 5836
piping shall be erected in its permanent hangers. Where not 5837
possible, prior to approval must be obtained from the Owner for
use of temporary hangers. Pipe shall not be supported from other 5838
piping, valves, flanges or equipment.

7.13 MODIFICATIONS BY THE OWNER 5840

7.13.1 5842

No permanent hangers shall be cinch anchored. The Contractor 5845
shall use available, existing embedded inserts or plates or, if
not available, core drilled anchor bolts, plates, or similar
devices for hanger attachments as shown on drawings. Unless 5846
shown otherwise on drawings, attachments to concrete surfaces
shall be Richmond screw anchors, each having ten kip capacity.

7.13.2 5848

Unless drawings indicate otherwise, maximum spacing of pipe 5850
supports shall be the same as shown in ASME Subsection NF,
ANSI B31.1 or ANSI B31.3 (Table 321.1.4.) as applicable. In the 5851
event that a greater spacing might be more suitable for a
particular location, the Contractor shall request approval from
the Owner.

7.13.3 5853

For specific application as directed by the Owner, vertical pipe 5855
in field-modified lines shall be supported by pipe clamps using
two vertical hanger rods. If more than one support is required 5856
on a riser, spring hangers as required to allow for vertical
expansion shall be provided and installed as directed by the
Owner.

7.13.0 5858

Hanger attachments shall be accurately located wth relation to 5860
building column center lines, equipment locations, and the
necessary hanger offset indicated on the drawings, when 5861
applicabe. In all instances where equipment location or 5862
attachment steel deviates from the design tolerances, the
Contractor shall notify the Owner and take all necessary
measurements to determine the proper attachment location.
Attachments for sliding supports, anchor bases, and floor stands 5863
shall be accurately shimmed and leveled to a true plane surface.
Where attachments are anchored to masonry floors or walls, the 5864
attachment plate shall be firmly grouted within 1/8 inch to
12 inch tolerance. (i.e. 1/8 inch vertical maximum deviation in 5865
12 inch horizontal length).

SECTION 8

8.0 CLEANING AND FLUSHING

8.1

The "Contractor" as expressed in this section shall be E.D.S. The Contractor shall submit a schedule listing the anticipated time and duration of each flush prior to flushing in order that plant operations may be adjusted to assure availability of flushing media and operating personnel.

8.2

After erection of piping systems and before hydrostatic testing the Contractor shall flush all systems.

8.3

All operations such as filling the systems, heating, and valve operation will be in accordance with procedures previously approved by the Owner.

8.4

Each flushing operation shall be recorded and witnessed on the Owner's report forms and must be concurrently witnessed and approved by the Owner prior to acceptance of the system by the Owner.

8.5

Major components of the NSSS shall not be connected for flushing (i.e. steam generators, reactor vessel). Nuclear code pipe systems shall not be subjected to in-place alkaline or acid cleaning except as directed by the Owner. Flushing connections shown on drawings shall be used.

8.6

Grades of water which shall be used for flushing systems are listed in Appendix 6. Where possible, the flush shall be of the recirculating type which continuously recycles a volume of water through a temporary strainer. Systems which contain air or gas shall be blown out with bottled dry air or nitrogen.

8.7 5913

Hoses and connections shall be provided to fill and drain the 5915
systems as required. Portable pumps capable of generating fluid 5916
velocities equal to or greater than the system operating
conditions shall be provided. Temporary strainers shall be as 5917
specified in Section 4. Filter cloth shall be provided to filter 5918
water drained from the system. The cloth shall be bleached 5919
cotton fabric of "nainsook" construction weighing approximately
3.0 ounces per yard and having 80 to 100 yarns per inch in both
the warp and fill directions.

8.8 Flushing Procedure 5921

8.8.1 5923

The system to be flushed shall be filled with the proper grade 5925
water through temporary connections. The temporary strainer and 5926
pump shall be installed at a convenient location, preferably at a
low point in the system. The duration of the initial flush shall 5927
be at least one hour in the recirculation mode, or thirty minutes
in the once-through mode. The flush of a system shall continue 5928
until two successive strainer or filter cloth checks pass the
acceptance criteria given below. Large, low velocity components 5929
shall be isolated from the flushing circuit. Piping systems 5930
two inches and smaller in diameter shall be provided with full
size supply and drain connections, and piping systems
2-1/2 inches and larger in diameter shall be provided with 5931
2-1/2 inch diameter supply and drain connections.

8.8.2 5933

During flushing operations, the Contractor shall priodically 5935
remove and clean all temporary and permanent strainers. Should 5936
differential pressures or restricted flow indicate the presence
of an obstruction in the system, it shall be the responsibility
of the Contractor to dismantle any necessary portions of the 5937
system required to locate and extricate the obstruction.

8.8.3 5939

Turbine oil systems shall be flushed in accordance with 5941
manufacturer's instruction

Category II, AP 13, Item 2

7.4 ADJUSTMENT OF HANGERS

7.4.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.4.2 Adjustment Prior to Testing and Flushing

After erection of each piping system and prior to hydrostatic testing, the Contractor shall inspect all hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, freedom of rods to swing and guides to permit movement without binding, and adequacy of all anchors. All threaded components shall be carefully inspected to assure full thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. Rigid supports of the trapeze type shall be thoroughly inspected to determine that the total load is equally distributed between the rods. Deflecton of support steel, as designated by the Engineer, shall be measured and recorded prior to cold springing or filling any piping system with water. Hanger travel stops shall not be removed unless the Owner directs specific hanger travel stop pin removal.

7.4.3 Hanger Adjustment for Pipe System Operation

7.4.3.1

The Owner's procedure on removal of hanger travel stops, hanger adjustments for the design cold load, and other steps to place completed systems into operation shall be followed by the Contractor as directed by the Owner. The Work requirement of this specification covers up to the accepted pipe hydrostatic tests. The subsequent application of insulation and finish painting or coating shall be performed by the Contractor according to separate specifications.

M470

7.4.3.2

All temporary attachments and devices used in installing the Work shall be removed from the work areas prior to pipe system turnover to the Owner.

7.5 TEMPORARY HANGERS

To minimize risk of personnel or equipment injury or damage, all piping shall be erected in its permanent hangers. Where not possible, approval must be obtained from the Owner for use of temporary hangers. Pipe shall not be supported from other piping, valves, flanges or equipment.

7.6 SUPPORT GUIDELINES FOR PLUMBING

7.6.1

Plumbing hanger Work by the Contractor shall be as shown on drawings and as described in this Section. Seismic supports will be supplied by others and erected by the Contractor in accordance with supplier's instruction.

7.6.2

No permanent hangers shall be cinch anchored. The Contractor shall use available, existing embedded inserts or plates or, if not available, core drilled anchor bolts, plates, or similar devices for hanger attachments as shown on drawings. Unless shown otherwise on drawings, attachments to concrete surfaces shall be Richmond screw anchors, each having ten kip capacity.

7.6.3

Hanger attachments shall be accurately located wth relation to building column center lines, equipment locations, and the necessary hanger offset indicated on the drawings, when applicable. In all instances where equipment location or attachment steel deviates from the design tolerances, the Contractor shall notify the Owner and take all necessary measurements to determine the proper attachment location. Attachments for sliding supports, anchor bases, and floor stands shall be accurately shimmed and leveled to a true plane surface. Where attachments are anchored to masonry floors or walls, the attachment plate shall be firmly grouted within 1/8 inch to

12 inch tolerance. (i.e. 1/8 inch vertical maximum deviation in 12 inch horizontal length).

7.6.4

The surfaces of brackets, clamps, etc., in direct contact with austenitic stainless steel piping shall be separated by stainless steel shims supplied by the hanger supplier.

7.6.5

Copper inserts shall be installed between the hanger and copper pipe to avoid direct contact of copper pipe with the steel or iron hanger.

7.6.6

Unless shown otherwise on drawings, horizontal runs of pipe shall be hung from heavy adjustable wrought iron or malleable iron pipe hangers spaced on a maximum of 10 feet-0 inches on center.

7.6.7

Unless shown otherwise on drawings, vertical runs of pipe shall be supported with heavy wrought iron clamps or collars. Supports shall be spaced on a maximum of 20 feet.

7.6.8

Chain, strap, perforated box, or wire hangers will not be permitted. Trapeze hangers will be permitted in lieu of separate hangers. All hangers supporting pipe of different services running near each other shall be in line and parallel as near as possible. Any plumbing pipe shall, wherever possible, be installed parallel or at right angles to the structure to provide a neat-appearing installation.

Category II, AP 13 Item 3.

i. Seismic restraints, anchors, guides, etc. may be located plus or minus 2 x pipe wall + 2 inches from its theoretical position.

ii. For attachments to center of structural steel reaction members - plus or minus two inches, and plumbness plus or minus 2 degrees.

In the use of these deviation values, when more than one direction plane is involved, the resultant value shall not exceed the deviation value.

7.4 ADJUSTMENT OF HANGERS

7.4.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.4.2 Adjustment Prior to Testing and Flushing

After erection of each piping system and prior to hydrostatic testing, the Contractor shall inspect all hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, freedom of rods to swing and guides to permit movement without binding, and adequacy of all anchors. All threaded components shall be carefully inspected to assure full thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. Hanger travel stops shall not be removed unless the Owner directs specific hanger travel stop pin removal. Rev 3

7.4.3 Hanger Adjustment for Pipe System Operation

7.4.3.1

The Owner's procedure on removal of hanger travel stops, hanger adjustments for the design cold load, and other steps to place completed systems into operation shall be followed by the

mm

Contractor as directed by the Owner. The Work requirement of this specification covers up to the accepted pipe hydrostatic tests. The subsequent application of insulation and finish painting or coating shall be performed by the Contractor according to separate specifications.

7.4.3.2

All temporary attachments and devices used in installing the Work shall be removed from the work areas prior to pipe system turnover to the Owner.

7.5 TEMPORARY HANGERS

To minimize risk of personnel or equipment injury or damage, all piping shall be erected in its permanent hangers. Where not possible, approval must be obtained from the Owner for use of temporary hangers. Pipe shall not be supported from other piping, valves, flanges or equipment.

7.6 SUPPORT GUIDELINES FOR PLUMBING

7.6.1

Plumbing hanger Work by the Contractor shall be as shown on drawings and as described in this Section. Seismic supports will be supplied by others and erected by the Contractor in accordance with supplier's instruction.

7.6.2

For permanent hanger installation, the Contractor shall use available, existing embedded inserts or plates or, if not available, core drilled anchor bolts, plates, or similar devices for hanger attachments as shown on drawings. Unless shown otherwise on drawings, attachments to concrete surfaces shall be Richmond screw anchors, Hilti Kwik Bolts, or Engineer approved equal. No cinch anchors shall be used for seismic category piping without prior approval of the Owner. Rev 3

7.6.3

Hanger attachments shall be accurately located wth relation to building column center lines, equipment locations, and the necessary hanger offset indicated on the drawings, when applicable. In all instances where equipment location or attachment steel deviates from the design tolerances, the Contractor shall notify the Owner and take all necessary measurements to determine the proper attachment location. Attachments for sliding supports, anchor bases, and floor stands shall be accurately shimmed and leveled to a true plane surface. Where attachments are anchored to masonry floors or walls, the attachment plate shall be firmly grouted within 1/8 inch to 12 inch tolerance. (i.e. 1/8 inch vertical maximum deviation in 12 inch horizontal length).

7.6.4 Rev 3

(Deleted)

7.6.5 Rev 3

(Deleted)

7.6.6

Unless shown otherwise on drawings, horizontal runs of pipe shall be hung from heavy adjustable wrought iron or malleable iron pipe hangers spaced as shown on the following table:

Pipe Size (Inches)	Max. Pipe Support Spacing (Feet)
3/4	7
1	7
1 1/2	7
2	10
2 1/2	10
3	12
4	14
6	17
8	19
10	19
12	23

Rev 3

7.6.7

Unless shown otherwise on drawings, vertical runs of pipe shall be supported with heavy wrought iron clamps or collars. Supports shall be spaced on a maximum of 20 feet.

7.6.8

Chain, strap, perforated box, or wire hangers will not be permitted. Trapeze hangers will be permitted in lieu of separate hangers. All hangers supporting pipe of different services running near each other shall be in line and parallel as near as possible. Any plumbing pipe shall, wherever possible, be installed parallel or at right angles to the structure to provide a neat-appearing installation.

Category 11, AP13 item 4

7.3 TOLERANCES

With respect to drawing locations, hangers shall be erected within the following permissive tolerance ranges unless the Owner directs otherwise:

a. For dead weight supports - plus or minus twelve inches axially, and plumbness plus or minus 2 degrees.

b. For seismic restraints

   i. Seismic restraints, anchors, guides, etc. may be located plus or minus 2 x pipe wall + 2 inches from its theoretical position.

   ii. For attachments to center of structural steel reaction members - plus or minus two inches, and plumbness plus or minus 2 degrees.

In the use of these deviation values, when more than one direction plane is involved, the resultant value shall not exceed the deviation value.

7.4 ADJUSTMENT OF HANGERS

7.4.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.4.2 Adjustment Prior to Testing and Flushing

After erection of each piping system and prior to hydrostatic testing, the Contractor shall inspect all hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, freedom of rods to swing and guides to permit movement without binding, and adequacy of all anchors. All threaded components shall be carefully inspected to assure full

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thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. Hanger travel stops shall not be removed unless the Owner directs specific hanger travel stop pin removal.

7.4.3 Hanger Adjustment for Pipe System Operation

7.4.3.1

The Owner's procedure on removal of hanger travel stops, hanger adjustments for the design cold load, and other steps to place completed systems into operation shall be followed by the Contractor as directed by the Owner. The Work requirement of this specification covers up to the accepted pipe hydrostatic tests. The subsequent application of insulation and finish painting or coating shall be performed by the Contractor according to separate specifications.

7.4.3.2

All temporary attachments and devices used in installing the Work shall be removed from the work areas prior to pipe system turnover to the Owner.

7.5 TEMPORARY HANGERS

To minimize risk of personnel or equipment injury or damage, all piping shall be erected in its permanent hangers. Where not possible, approval must be obtained from the Owner for use of temporary hangers. Pipe shall not be supported from other piping, valves, flanges or equipment.

7.6 SUPPORT GUIDELINES FOR PLUMBING

7.6.1

Plumbing hanger Work by the Contractor shall be as shown on drawings and as described in this Section. Seismic supports will be supplied by others and erected by the Contractor in accordance with supplier's instruction.

7.6.2

For permanent hanger installation, the Contractor shall use available, existing embedded inserts or plates or, if not available, core drilled anchor bolts, plates, or similar devices for hanger attachments as shown on drawings. Unless shown otherwise on drawings, attachments to concrete surfaces shall be Richmond screw anchors, Hilti Kwik Bolts, or Engineer approved equal. No cinch anchors shall be used for seismic category piping without prior approval of the Owner.

7.6.3

Hanger attachments shall be accurately located wth relation to building column center lines, equipment locations, and the necessary hanger offset indicated on the drawings, when applicable. In all instances where equipment location or attachment steel deviates from the design tolerances, the Contractor shall notify the Owner and take all necessary measurements to determine the proper attachment location. Attachments for sliding supports, anchor bases, and floor stands shall be accurately shimmed and leveled to a true plane surface. Where attachments are anchored to masonry floors or walls, the attachment plate shall be firmly grouted within 1/8 inch to 12 inch tolerance. (i.e. 1/8 inch vertical maximum deviation in 12 inch horizontal length).

7.6.4

(Deleted)

7.6.5

(Deleted)

7.6.6

Unless shown otherwise on drawings, horizontal runs of pipe shall be hung from heavy adjustable wrought iron or malleable iron pipe hangers spaced as shown on the following table:

Pipe Size (Inches)	Max. Pipe Support Spacing (Feet)
3/4	7
1	7
1 1/2	7
2	10
2 1/2	10
3	12
4	14
6	17
8	19
10	19
12	23

7.6.7

Unless shown otherwise on drawings, vertical runs of pipe shall be supported with heavy wrought iron clamps or collars. Supports shall be spaced on a maximum of 20 feet.

7.6.8

Chain, strap, perforated box, or wire hangers will not be permitted. Trapeze hangers will be permitted in lieu of separate hangers. All hangers supporting pipe of different services running near each other shall be in line and parallel as near as possible. Any plumbing pipe shall, wherever possible, be installed parallel or at right angles to the structure to provide a neat-appearing installation.

Category II, AP13, item 5

7/11/77
35-1195

437 169

Brown & Root, Inc. Post Office Box 1001, Glen Rose, Texas 76043

July 11, 1977

PCP-1 (6/7/77)
4.6.1.6 (p.16)
APPROVED
TUF-3338

BRF-6565

Mr. J.T. M
Texas Util
P.O. Box 1
Glen Rose,

, Inc.
c Station
ation
[redacted]
tion

Dear Mr. Merritt:

Subject procedure is transmitted herewith for your approval, per specification requirements.

ARMS INDEXED			
DCN:	C BRF/BRF-06565		
MSC:	TPPCP/35-1195-PCP-1/0		
DI:	TO:	FROM:	

Rq TUF-03388

ARMS INDEXED			
DCN:	CGT/TUF-03388		
MSC:	TPPCP/35-1195-PCP-1/1		
DI:	TO: BK/HCD	FROM: TUS/JTM	

WHH Rq BRF-06565

Very truly yours,

BROWN & ROOT, INC.

H.C. Dodd, Jr.
Project Manager

HCD/WHH/sn
Attachment
cc:
L.A. Ashley (1L,1A)
P.L. Bussolini (1L)
M.M. Fitch/L.D. Pyeatt (1L)
J.T. Merritt (0,1A)
H.C. Schmidt (3L,3A)
R.G. Tolson (1L,1A)
H.L. Jenkins (1L)
W.E. Childress, Jr. (1L)

TUF-3388
APPROVED:

J.T. Merritt, Jr.
Resident Manager
TUSI

Date 7-

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4.5.3 Stainless steel covered fabrication tables, rolls, etc. which have been used for fabrication of carbon steel items shall be decontaminated prior to reuse on stainless steel items by removing loose dirt, steel fillings, etc. with a standard commercial dust brush, vacuum cleaner, rag, or other similar means; decontamination by solvent cleaning, shot-blasting, and the like is not required.

4.5.4 All instruments except for measuring devices such as framing squares, protractors, hand levels, pocket tapes, 50 feet tapes, and tri-squares, shall be calibrated in accordance with Reference 19.

4.5.5 Certain tools such as files, vises, hack saw blades, chucks, carbide tips, drills, hole-saws, etc. are made of carbon steel and will not be used interchangeably on carbon steel and stainless steel. Those tools used for stainless steel shall be color coded flourescent orange.

4.5.6 No instruments, tools, etc. containing mercury shall be used unless specifically required by the design drawings and/or specifications.

4.6 ERECTION

4.6.1 The normal sequence for erection of pipe spools and components should be as follows:

a. Select pipe spool, valve, etc. by identification number shown on installation drawing from the staging area.

b. Rig components into the supports either permanent or temporary; placing shims as required.

c. Remove end cap

d. Prepare weld ends and flange faces as required

e. Prepare in-line components for welding as required e.g., open gate valves half-way, disassemble diaphragm valves, etc.

f. Make joint fit-up

g. Purge weld joint as required

h. Complete joint either weld-out or bolt torquing

i. Stress relieve joint as called for on installation drawings

j. Apply color ribbons as required to indicate radiography requirements shown on installation drawing or as requested by B&R QC Inspector.

k. Lay-up system as required

l. Paint field welds and touch-up as required

m. Pressure test system

n. Insulate piping as required

4.6.2 No piping joints to equipment may be made until approved by TUSI. Once the equipment has been approved for piping hook-up by TUSI the PME will place a tag on the equipment indicating the approval, see Attachment 4. This tag must be on the equipment prior to connection or a written memo by the PME releasing the equipment for connection must be received by the GPS prior to connection.

4.6.3 All welding, weld material control, weld documentation and inspections shall be performed in accordance with the project welding, QA/QC, and associated procedures.

4.6.4 Pipe cutting shall be performed by machining, sawing or cutting with iron-free aluminum oxide abrasive discs. Torch cutting is allowed on carbon steel materials only and provided the surfaces are ground smooth after the cutting operation. When torch cutting, the material shall be preheated to the same temperature used in qualifying the welding procedure which will be used to weld the cut piece. Preheat requirements will be indicated on the fabrication drawing when the temperature is higher than 60° F for carbon steel.

4.6.5 Post weld heat treatment shall be performed in accordance with Reference 14 as called for on the fabrication drawing.

4.6.6 Arc strikes are strictly forbidden, however if they inadvertently occur they shall be removed by grinding and the ground areas liquid penetrant examined. The QC Inspector shall be notified by the Pipe Foreman prior to grinding on "Q" items while the PME or weld technician shall be notified on Non-"Q" items. The PME will check the wall thickness on Non-"Q" items when a possible minimum wall violation has occurred.

4.6.7 All weld spatter shall be removed from piping surfaces by buffer wheel, chipping, grinding, wire brushing and/or shot blasting except when prohibited by Paragraph 4.6.8. After weld spatter removal on "Q" piping by the grinding method, the surface shall be liquid penetrant examined. Grinding of stainless steel surfaces shall be performed with carbide or aluminum oxide grinding wheels which have been color coded for use on stainless. Wire brushing of stainless steel surfaces shall be performed using stainless steel brushes properly color coded. Shot blasting of stainless steel materials shall be performed using iron free alumina grit, iron free silica grit, or iron free silicon carbide grit. The blasting equipment shall be thoroughly cleaned of other materials used in previous operations prior to use on stainless steel.

4.6.8 Surfaces which require L.P. examination shall not be shot blasted or power wire brushed prior to the L.P. examination. If they inadvertently are shot blasted or power wire brushed then the surface to be L.P. examined shall be cleaned with an abrasive flapper wheel.

4.6.9 Machining of pipe weld ends, fittings, etc. shall be performed in accordance with Reference 7.

4.6.10 After drilling piping all bores shall be deburred.

4.6.11 Tape used on butt weld joints to maintain weld gas purges shall be Nashua No. 357, grey or approved equal.

4.6.12 All weld end valves except diaphragm, control and check valves shall be opened approximately 50% prior to welding. Diaphragm valves shall have the diaphragm removed prior to welding. All other valves and in-line components which due to their internals require special considerations during the welding process will be noted on the installation drawing. Valve disassembly shall be performed in accordance with Reference 27.

4.6.13 Screwed Joints

4.6.13.1 The joint compound used on screwed joints shall be Rectorseal No. 5 as manufactured by Rectorseal Corporation, Houston, Texas. Joint compound shall not be used on joints which are to be subsequently seal welded. A batch analysis is required when purchasing the Rectorseal No. 5 stating that it has less than 15 PPM and 10 PPM leachable chlorides and fluorides respectively.

4.6.13.2 Where screwed joints are to be seal welded, the exposed thread shall be completely covered with weld metal.

4.6.13.3 Tapered threads in pipe shall be of proper length and depth to ensure the drawing up of a pressure-tight joint without excessive length of male thread showing outside of the fitting, see Attachment 5 for proper length. All cut and threaded ends shall be reamed and free from burrs and obstructions.

4.6.14 Flange Joints

4.6.14.1 Flange faces shall be thoroughly cleaned as required to remove rust, scale, dirt, old paint, etc. Flange faces on lined equipment and piping systems such as the Circulating Water System, Service Water System and Chlorine System will have the internal lining on the flange face; this lining or coating shall not be removed from the flange face.

4.6.14.2 Gasket materials shall be in accordance with that shown on the installation drawings. No gaskets or gasket material shall be reused unless approved in writing by TUSI.

4.6.14.3 Stud and nut materials shall be in accordance with that shown on the installation drawings. The stud length shall be such that at least one full thread appears on the stud past the nut face for the tightened bolted joint.

4.6.14.4 For underground flanges, the nut seat flange surfaces shall be cleaned of all protective coating and film before assembly of the studs and nuts.

4.6.15 Expansion Joints

4.6.15.1 The piping and/or equipment connected to the expansion joint shall be aligned to within the tolerances given by the expansion joint manufacturer. Where excessive misalignments do occur, the GPS should consult with the PME who will advise in writing, after approval by TUSI, the acceptable misalignment.

4.6.15.2 Expansion joints received with factory-set sizing bars shall be erected and bolted or welded in position prior to removing the sizing bars.

4.6.15.3 After expansion joint installation the piping permanent supports, anchors and guides shall be completed to the extent that distortion of the expansion joint during completion of the remaining work on the system does not occur. If the permanent supports, anchors and guides are not available then temporary ones shall be installed to safely handle loads affecting the expansion joints. The PME will design the temporary hangers, anchors and guides and issue the design to the GPS after TUSI has approved the design.

4.6.15.4 Expansion joints not furnished with insulation covers shall be protected with temporary sheet metal covers until all welding and burning in the area is completed. The cover shall provide a minimum of 1 inch clearance beyond the outside of the bellows.

4.6.15.5 The temporary sizing bars should be removed prior to hydrostatic testing, unless otherwise instructed by the manufacturer. The PME will advise in writing the GPS of cases where the temporary sizing bars are to remain during the hydrostatic test.

4.6.16 Penetration Through Walls and Slabs

4.6.16.1 Sleeves shall be placed around the pipe where it penetrates floors and walls as called for on the G&H composite and/or structrual drawings. Sleeves through blockouts shall be concentrically positioned around the pipe by wooden chocks unless shown otherwise on the drawings. When sleeves are installed in blockouts, their centerlines shall be within 1/4 inch of the piping centerlines. Piping and sleeves shall be parallel within 1/16 inch per foot.

4.6.16.2 When it becomes necessary to cut rebar extending through a blockout, unless otherwise called for on the drawings, the PME shall request TUSI permission to cut the rebar by use of a Request for Information or Clarification or a Field Design Change Request. The rebar shall be cut so as to provide approximately 1/2 inch clearance from the pipe or pipe sleeve. There shall be no welding other than cadwelding to the rebar.

4.6.16.3 Filler material shall be placed between pipes and sleeves, or between the pipe insulation and the sleeves as required on G&H drawings. The filler material shall be approved by TUSI prior to use. The PME will advise the GPS in writing of the filler material to be used.

4.6.16.4 Seal boots shall be installed per the manufacturer's instructions where called for on the G&H drawings.

4.6.17 Valves

4.6.17.1 Valve operator orientation will normally be shown on the installation isometric. However, in some cases this may be impractical, therefore, prior to welding or bolting any valve in the system its operator orientation shall be checked against the G&H composite piping drawing by the GPS.

4.6.17.2 Unless otherwise noted on the installation drawing or valve body, globe valves shall be installed such that the flow goes under the valve seat.

4.6.17.3 When it becomes necessary as determined by the GPS to install pipe spools adjacent to valves which are not available for installation, temporary spools may be installed in place of the missing valves, see Attachment 6 for typical valve spool configurations. Once the valve is received and released for installation, the temporary spool should be removed and the valve installed. Welding operations on temporary valve spool installations on "Q" lines will be inspected by the B&R QA/QC Department.

4.6.18 Temporary Strainers

4.6.18.1 Temporary strainers shall be installed as called for on the installation drawings.

4.6.18.2 The strainers will remain in-place until flushing is complete. The strainers shall not be removed after system turnover without a written directive from TUGCO.

4.7 ALIGNMENT

4.7.1 The piping shall be located to the dimensions shown on the G&H composite drawings and/or the B&R installation drawings. In cases of discrepancies between B&R installation drawings and G&H composite drawings, G&H composite drawings shall govern. For piping 2 inch diameter and smaller G&H approved Grinnell piping isometrics shall govern.

4.7.2 Final connections to equipment and valve flanges or nozzles shall be accomplished by adjustment of the piping and supports to provide accurate alignment at these joints without stressing of the pipe, equipment or valves. Springing, bending, or localized heating to obtain alignment is not to be done without approval of TUSI. This approval may be obtained by use of Attachment 7.

4.7.3 Temporary attachment lugs, straps, etc. used for weld fit-up and alignment shall be as called for in references 21 and 22.

4.7.4 Weld joint alignment shall be in accordance with References 21 and 22.

4.7.5 Once the piping has been brought into position, the piping location shall be checked against the installation drawing for conformity by the craftsman. Piping out of design location greater than that allowed in Paragraph 4.7.9 shall be adjusted until it is within the allowed tolerance. When this tolerance cannot be met without bending of the piping, cold springing, or localized heating, the GPS should advise the PME. A technique for line-up will be prepared and submitted to TUSI for approval. This will be done by the PME normally by completing Attachment 7 and submitting it to TUSI.

4.7.6 Measurements for piping locations shall be taken using control base lines and bench marks set up by the B&R Field Engineering Department. The use of as-built column lines, floor lines and other structures as references is not permitted.

4.7.7 Carbon steel piping with a wall thickness greater than 3/4 inches must be heat treated after cold bending per Reference 14.

4.7.8 Flange face alignment shall be within 3/64 inches normal and with respect to flange, outside diameter. The craftsman shall measure the flanges at fit-up to assure this requirement is met.

4.7.9 Design location tolerances are as follows:

a. Gradient - 1/16 inch per foot maximum
b. All Process Piping - ± 2 inch maximum
c. Constraints - A minimum 2 inch clearance shall be maintained, incldng pipe insulation, with respect to other piping. Minimum slopes as designed on drawings shall be maintained for proper venting and drainage.

4.7.10 Mitering of pipe joints except as shown on the design drawing is not permitted unless approved by TUSI. When larger mitering is considered advantageous by the GPS he should notify the PME who will obtain TUSI approval, see Attachment 7.

4.8 MATERIAL DEFECTS

4.8.1 The minimum wall thickness for pipe called out to a "schedule" on the fabrication drawings shall not be less than shown on Attachment 12; while the minimum wall thickness for pipe called out as "minimum wall" shall not be less than the thickness called for on the fabrication drawing.

4.8.2 Defects in the base materials of pressure boundry items which either encroach on the minimum wall thickness of the components or are suspect of violating minimum wall shall be brought to the attention of the PME for resolution. The minimum wall thickness for pipe and butt weld fittings shall be determined per Paragraph 4.8.1; while the minimum wall thickness for all other items shall be determined by the PME on a case by case basis. When it is undeterminable by the PME whether a defect does encroach on minimum wall, TUSI will be advised by a Request for Clarification form.

Category 11, AP13, item 6

7.3 TOLERANCES

With respect to drawing locations, hangers shall be erected within the following permissive tolerance ranges unless the Owner directs otherwise:

a. For dead weight supports - plus or minus twelve inches axially, and plumbness plus or minus 2 degrees.

b. For seismic restraints

i. Seismic restraints, anchors, guides, etc. may be located plus or minus 2 x pipe wall + 2 inches from its theoretical position.

ii. For attachments to center of structural steel reaction members - plus or minus two inches, and plumbness plus or minus 2 degrees.

In the use of these deviation values, when more than one direction plane is involved, the resultant value shall not exceed the deviation value.

7.4 ADJUSTMENT OF HANGERS

7.4.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.4.2 Adjustment Prior to Testing and Flushing

After erection of each piping system and prior to hydrostatic testing, the Contractor shall inspect all hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, freedom of rods to swing and guides to permit movement without binding, and adequacy of all anchors. All threaded components shall be carefully inspected to assure full

thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. Hanger travel stops shall not be removed unless the Owner directs specific hanger travel stop pin removal.

7.4.3 Hanger Adjustment for Pipe System Operation

7.4.3.1

The Owner's procedure on removal of hanger travel stops, hanger adjustments for the design cold load, and other steps to place completed systems into operation shall be followed by the Contractor as directed by the Owner. The work requirement of this specification covers up to the accepted pipe hydrostatic tests. The subsequent application of insulation and finish painting or coating shall be performed by the Contractor according to separate specifications.

7.4.3.2

All temporary attachments and devices used in installing the Work shall be removed from the work areas prior to pipe system turnover to the Owner.

7.5 TEMPORARY HANGERS

To minimize risk of personnel or equipment injury or damage, all piping shall be erected in its permanent hangers. Where not possible, approval must be obtained from the Owner for use of temporary hangers. Pipe shall not be supported from other piping, valves, flanges or equipment.

7.6 SUPPORT GUIDELINES FOR PLUMBING

7.6.1

Plumbing hanger work by the Contractor shall be as shown on drawings and as described in this Section. Seismic supports will be supplied by others and erected by the Contractor in accordance with supplier's instruction.

7.6.2

For permanent hanger installation, the Contractor shall use available, existing embedded inserts or plates or, if not available, core drilled anchor bolts, plates, or similar devices for hanger attachments as shown on drawings. Unless shown otherwise on drawings, attachments to concrete surfaces shall be Richmond screw anchors, Hilti Kwik Bolts, or Engineer approved equal. No cinch anchors shall be used for seismic category piping without prior approval of the Owner.

7.6.3

Hanger attachments shall be accurately located wth relation to building column center lines, equipment locations, and the necessary hanger offset indicated on the drawings, when applicable. In all instances where equipment location or attachment steel deviates from the design tolerances, the Contractor shall notify the Owner and take all necessary measurements to determine the proper attachment location. Attachments for sliding supports, anchor bases, and floor stands shall be accurately shimmed and leveled to a true plane surface. Where attachments are anchored to masonry floors or walls, the attachment plate shall be firmly grouted within 1/8 inch to 12 inch tolerance (i.e., 1/8 inch vertical maximum deviation in 12 inch horizontal length).

7.6.4

(DELETED)

7.6.5

(DELETED)

7.6.6

Unless shown otherwise on drawings, horizontal runs of pipe shall be hung from heavy adjustable wrought iron or malleable iron pipe hangers spaced as shown on the following table:

Pipe Size (Inches)	Max. Pipe Support Spacing (Feet)
3/4	7
1	7
1-1/2	7
2	10
2-1/2	10
3	12
4	14
6	17
8	19
10	19
12	23

7.6.7

Unless shown otherwise on drawings, vertical runs of pipe shall be supported with heavy wrought iron clamps or collars. Supports shall be spaced on a maximum of 20 feet.

7.6.8

Chain, strap, perforated box, or wire hangers will not be permitted. Trapeze hangers will be permitted in lieu of separate hangers. All hangers supporting pipe of different services running near each other shall be in line and parallel as near as possible. Any plumbing pipe shall, wherever possible, be installed parallel or at right angles to the structure to provide a neat-appearing installation.

Category II AP13 Item 7

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION IV

Report No. 50-445/80-11; 50-446/80-11

Docket No. 50-445; 50-446 Category A2

Licensee: Texas Utilities Generating Company
2001 Bryan Tower
Dallas, Texas 75201

Facility Name: Comanche Peak, Units 1 and 2

Inspection at: Comanche Peak Steam Electric Station, Glen Rose, Texas

Inspection conducted: April and May 1980

Inspector: W. A. Crossman 6/16/80
for R. G. Taylor, Resident Reactor Inspector Date
Projects Section

Approved: W. A. Crossman 6/16/80
W. A. Crossman, Chief, Projects Section Date

Inspection Summary:

Inspection During April and May 1980 (Report 50-445/80-11; 50-446/80-11)
Areas Inspected: Routine, announced inspection by the Resident Reactor Inspector (RRI) including follow up to previous inspection findings; general site tours; safety-related pipe and equipment installations; concrete repair activities; electrical installation activities; and protection of major components. The inspection involved one hundred fifty-five inspector-hours by one NRC inspector.
Results: Of the seven areas inspected, no items of noncompliance were identified in six areas. One item of noncompliance was identified in one area (infraction - failure to follow piping installation procedures - paragraphs 2 and 7).

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DETAILS

1. Persons Contacted

Principal Licensee Employees

*J. B. George, TUSI, Project General Manager
*J. T. Merritt, TUSI, Construction and Engineering Manager
*D. N. Chapman, TUGCO, Quality Assurance Manager
*R. G. Tolson, TUGCO, Site Quality Assurance Supervisor

The RRI also interviewed other licensee and Brown & Root employees during the inspection period including both craft labor and QA/QC personnel.

*Denotes those persons with whom the RRI held on-site management meetings during the inspection period.

2. Action on Previous Inspection Findings

(Closed) Infraction (50-445/79-18): Failure to Control Inspection Stamps. As noted in paragraph 2 of Inspection Report 50-445/79-27; 50-446/79-26, the use of numbered inspection stamps has been discontinued and the implementing procedure cancelled. The licensee's Site Surveillance Group interviewed all QC personnel to whom such stamps had been issued and who had failed to return them when the cancellation took place to ascertain the reason for the nonreturn and approximately when the stamp was lost or misplaced. Personnel no longer in QC by reason of termination were not interviewed. The dates of loss and/or termination were then used as the basis for an extensive QA records search to determine if the missing stamps had been improperly used. The records search failed to reveal any such improper use and the licensee concluded that the loss of the stamps was attributed to personnel carelessness rather than any overt act.

The RRI had no further questions on this matter.

(Closed) Unresolved Item (50-445/80-01; 50-446/80-01): Class 1 to Class 2 Transition Orifices. The licensee has issued Component Modification Cards 33001 and 33002 which require the installation of the required transition orifices in the manner orginally called for in the design drawings at a location approximately six inches from the improperly sized orifices. The improperly sized orifices will be plugged and seal welded.

The RRI had no further questions on this matter but will follow the implementation of the above Component Modification Cards during routine inspections.

(Closed) Infraction (50-445/80-01; 50-446/80-01): Failure to Provide Instructions and Procedures Appropriate to the Circumstances. The licensee informed RIV, by letter dated February 19, 1980, that their analysis of

the as-built mounting of the battery chargers indicated that the mounting provided adequate strength to satisfy seismic requirements. The licensee also stated that engineering procedures were being revised to require an Architect/Engineer review of equipment mounting details in addition to that already required by the equipment vendor. The RRI has verified that the procedure has been revised and implemented.

The RRI had no further questions on this matter.

(Closed) Deficiency (50-445/80-08; 50-446/80-08): Failure to Report a Significant Construction Deficiency. The licensee informed RIV, by letter dated April 21, 1980, that a review of the reporting requirements of 10 CFR 50.55(e) had been accomplished and that a meeting in the RIV office, as documented by Inspection Report 50-445/80-12; 50-446/80-12, had rendered further clarification of the requirements. The licensee stated that necessary instructions had been given to appropriate personnel in the matter. The RRI has interviewed these personnel and is satisfied that they now understand and will implement the requirements fully. For further information relative to the "honeycomb" condition referred to in the original finding, see paragraph 4 of this report.

This item is considered closed.

(Closed) Infraction (50-445/80-11; 50-446/80-11): Failure to Follow Piping Installation Procedures. This infraction, which is discussed in paragraph 7 of this report, was forwarded by RIV letter dated April 9, 1980. The licensee reported to RIV, by letter dated May 5, 1980, that an analysis of the reported situation showed that no excessive strain had been placed on the pump nozzle involved. The RRI reviewed these calculations with the NSSS supplier and was satisfied that no damage had been incurred. The licensee also committed to additional inspection for like items which was accomplished and the results documented. Other situations were found of a like nature and fortunately no harm to equipment was involved. The licensee stated that piping installation procedures have been revised to make it clear to the craft labor force that piping connections to equipment are not to be made until the piping is supported properly with hangers rather than by simple cribbing.

The RRI observed, during tours of the facility, that the revised procedures had been implemented and had no further questions.

(Closed) Infraction (50-445/80-08; 50-446/80-08): Failure to Follow Procedures for Reporting and Repair of Damaged Electrical Cable. The licensee informed RIV, by letter dated May 14, 1980, that a new cable would be pulled through the buried bus duct to replace the damaged cable. In addition, new cables were also pulled to replace several other cables in the duct that were damaged in the search for the cable originally reported. The licensee also stated, in the referenced letter, that Management/Supervisory Seminars had been held to emphasize the need to follow all project procedures. The RRI reviewed documentation indicating that eighty-two persons, including

electrical department superintendents, general foremen, and foremen, attended one of two such seminars. Interviews with two electrical crew foremen indicate that they are aware of the procedural requirements.

The RRI had no further questions.

3. Site Tours

The RRI toured the safety-related plant areas several times weekly during the inspection period to observe the general progress of construction of the practices involved. Five of the tours were accomplished during portions of the second shift. Since the principal effort of the second shift is the installation of electrical cables, primary emphasis was placed on this activity.

No items of noncompliance or deviations were identified.

4. Concrete Repair Activities

The RRI observed substantial portions of the activities involved in the removal of the defective concrete in the "honeycomb" areas of the Unit 2 Reactor Containment Building internal walls as discussed in Inspection Reports 50-445/80-01; 50-446/80-01 and 50-445/80-08; 50-446/80-08.

The RRI examined a number of the cavities after removal of the "honeycomb," after application of concrete bonding agents, and again after the repair formwork was in place for the concrete pour back. In one area, the sleeve through the wall for the reactor coolant pipe had to be partially removed to gain access to the defective concrete. The RRI observed portions of the weld repair to the sleeve to re-establish its orginal configuration. The welding was accomplished in accordance with the engineer's instructions by qualified welders utilizing qualified weld procedures. As of the end of the inspection period, the entire repair effort was essentailly complete and appeared to have been done in a sound manner in accordance with recognized concrete repair practices.

The licensee officially informed RIV of the above matter as required by 10 CFR 50.55(e) in a letter dated April 21, 1980. The report outlines the engineering evaluations performed, the safety impact had the defects gone unrecognized and/or unrepaired, and the repair methods to be utilized.

No items of noncompliance or deviations were identified.

5. Major Component Installation Activities

During the inspection period, the RRI observed the efforts involved in installing the last two steam generators and the first two Reactor Coolant pumps in the Unit 2 Reactor Containment Building. The RRI observed the

initial preparation of the steam generators for hoisting into the building, the actual hoisting and movement, and finally the setting and alignment of the units on their support columns. Each step was observed to be in accordance with Operation Travelers RI80-369-3400 and ME80-2005-5500 governing the work of the riggers and millwrights, respectively. The RRI also reviewed the steps indicated by the two Operation Travelers with the NSSS supplier representatives on site and verified that the steps utilized were in consonance with the supplier's written recommendations. The RRI reviewed data developed by the site field engineers (surveyors) which showed that the generators are well within the established vertical requirements of the vendor and that each of the four support columns are carrying approximately equal load. In regard to the Reactor Coolant pump installation, the RRI observed the work involved in setting the pumps on their columns and establishing the pumps into an essentially level position.

The RRI also observed the preliminary installation of two of the Reactor Coolant pipe legs through the sleeves leading to the Reactor Pressure Vessel. These pipe sections were carefully handled and placed into position in accordance with good practice.

No items of noncompliance or deviations were identified.

6. Reactor Coolant Pressure Boundary Piping Installation

The RRI made limited observations of piping component handling in the Reactor Coolant Pressure Boundary area during the period. The RRI observed two welds in process as follows:

Weld Number:	FW-3A	FW-20
Isometric:	RC-1-RB-026	SI-1-RB-037
Line Identification:	14-RC-1-135-2501R1	10-RC-1-021-2501R1
Welder Identification:	AWT and BMK	BAG
Weld Procedure:	99025 (Machine GTAW)	88025 (Manual GTAW)
Filler Metal Identification:	463870	762550

Subsequent to the observation of welding, the RRI verified that the welders, weld procedures and weld filler metals were each properly qualified in accordance with the ASME Code, Section III or IX as appropriate. In addition, the RRI also examined the radiographs taken of the welder qualification test coupons for welders BAG, BLU, AXC, BPA and AED. These

radiographs, which are an examination alternative of ASME, Section IX (the other alternative is prescribed bend tests), indicated a sensitivity technically acceptable per Section V of the Code. The RRI discussed the radiographs with the supervising radiographer who stated that the fuzziness of the radiographs was caused by energy scatter from the source (Iridium 192). Since the radiographs met all technical requirements of the Code, he felt there was no problem. The RRI agreed that the Code had been technically satisfied, but at a marginal or minimum level and the radiographs could be substantially improved by a better technique. The RRI will pursue this matter during future inspections. The above discussed radiographs indicated that each welder had accomplished a weld or welds that satisfied the Code requirements and were, thus, fully qualified to perform production welding.

The RRI also examined radiographs of the following reactor coolant boundary (Class 1) welds:

Weld Identification	Isometric	Line Number
W-6	SI-2-RB-042	2-SI-2-086-2501R1
FW-12	SI-1-RB-21	3-SI-1-033-2501R1
W-14	SI-2-RB-042	2-SI-2-086-2501R1
W-14	SI-1-RB-020	1.5-SI-1-020-2501R1
W-12	SI-2-RB-042	2-SI-2-086-2501R1
W-6	CS-1-RB-031B	2-CS-1-105-2501R1
FW-1-1	RC-1-RB-15	3-RC-1-111-2501R1
FW-10-2	RC-1-RB-15	3-RC-1-111-2501R1
FW-38-1	RC-1-RB-15	3-RC-1-146-2501R1
W-10	CS-1-RB-031B	1.5-CS-1-249-2501R1
W-8	CS-1-RB-031B	1.5-CS-1-105-2501R1
W-9	CS-1-RB-031B	1.5-CS-1-105-2501R1
W-7	CS-1-RB-031B	1.5-CS-1-105-2501R1
W-2	CS-2-RB-074	2-CS-2-112-2501R1
W-5	CS-1-RB-031B	2-CS-1-105-2501R1

W-3	CS-1-RB-028	2-CS-1-112-2501R1
W-18	RC-1-RB-15	3-RC-1-111-2501R1
FW-42	RC-1-RB-15	3-RC-1-146-2501R1
FW-6	RC-1-RB-08	3-RC-1-052-2501R1
W-6	RC-1-RB-06	6-RC-1-70-2501R1
FW-3	RC-1-RB-017	4-RC-1-075-2501R1
FW-38-2	RC-1-RB-05	3-RC-1-146-2501R1
FW-2	RC-1-RB-017	4-RC-1-075-2501R1
W-5	SI-2-RB-042	2-RC-2-086-2501R1
W-35	SI-1-RB-015	2-SI-1-086-2501R1
FW-11	SI-1-RB-021	3-SI-1-033-2501R1
FW-1	RC-1-RB-06	12-RC-1-069-2501R1
FW-5A	RH-1-RB-02	12-RH-1-022-2501R1

No items of noncompliance or deviations were identified.

7. Other Safety-Related Piping Installation Activities

The RRI observed welder AHI during a period when the welder was working on joint FW-5 as identified on isometric CT-1-RB-17 in line 10-CT-1-027-301R2. The welder was working to Weld Procedure 88021 using filler metal Heat Number 463638. The qualification of the procedure and this heat of filler metal have been verified several times during previous inspection. Review of the welder qualification records for AHI indicate that he has been properly qualified in accordance with ASME, Section IX.

The RRI also examined the licensee actions in regard to implementation of his commitment to radiograph and repair those field welds in the Safety Class 3 Component Cooling Water and Auxiliary Feedwater Systems that do not require radiographs under the Code. (For more information regarding this commitment, see Inspection Reports 50-445/79-12 and 50-445/79-17.) The personnel managing the program indicated that approximately 56% of the 1842 welds involved have, to date, been radiographed and that about 37% of those requiring repair have been repaired. The RRI randomly selected the following radiographs for review:

Weld Identification	Isometric	Line Number
FW-10	AF-1-SB-23	4-AF-1-102-152-3
FW-25	AF-1-YD-05	3-AF-1-86-152-3
FW-13	CC-1-RB-042	3-CC-1-232-152-3
FW-10A	CC-1-RB-58A	3-CC-1-234-152-3
FW-30	CC-1-RB-58A	3-CC-1-234-152-3
FW-1	CC-2-AB-045	3-CC-2-118-152-3
FW-22-R1	AF-1-SB-10	6-AF-1-33-152-3
FW-28-R1	AF-1-SB-15	4-AF-1-102-152-3
FW-3-R1	AF-1-SB-72	3-AF-1-72-152-3
FW-24-R1	CC-1-RB-041	3-CC-1-232-152-3

The RRI made numerous observations of the general pipe and component handling operations in both Units 1 and 2 during the inspection period and found that good practices were being followed as outlined in the General Piping Procedure CPM-6.9. In one instance however, the RRI observed a situation that was of concern in that possible major safety component damage might have occurred which could easily have gone undetected. The RRI found that a pipe assembly, consisting of several feet of six inch diameter pipe, was being entirely suspended by attachment to the suction nozzle flange of the Unit 2 Train A Safety Injection pump TCX-SIAPSI-01. Further investigation developed that the pipe assembly would place a torque load on the nozzle of between 1500 and 2000 foot-pounds. The RRI found that CPM 6.9 did not provide instructions on this matter to the labor force, although the project Mechanical Erection Specification (MS-100) specifically prohibited such practices. The RRI notified the licensee of the situation which was in turn followed up with a Notice of Violation dated April 9, 1980.

The licensee responded to the initial notification by having the other installed pumps and valves in Unit 2 checked for like situations. A very limited number of other comparable situations were identified during this inspection.

The RRI identified situation and others identified by the licensee were detailed on Nonconformance Reports which were submitted to the component

vendor, Westinghouse, for analysis of possible damage to the components. The analysis indicated that no damage was likely to have occurred due to the static loading on the nozzles, although had the pipe been of a heavier schedule or longer in length, such damage would have occurred. The Westinghouse analysis was reviewed by the RRI who had no question of its accuracy.

The licensee's investigation of the circumstances surrounding the incident indicated that the pipefitters had the pipe supported by temporary wooden blocks or jack stands when they left the work area. These workers were subsequently reassigned to other work and did not return to the area. In the meantime, it appears that a group of painters were assigned to paint the floors in the area and removed the temporary shoring under the piping leaving it suspended from the nozzles.

The labor force was notified that this practice must cease and the licensee also revised CPM 6.9 to provide specific instructions in the matter. All of these actions were consummated during the period covered by this report, and as noted in paragraph 2, this item of noncompliance is considered to have been satisfactorily closed.

Except as noted above, no items of noncompliance or deviation were identified.

8. Electrical Installation Activities

The RRI made a number of observations of electrical cable installations during the inspection period. The primary inspection effort was directed toward observing the activities of the various cable pulling crews and toward this end at least five crews were checked. During most of the period there were seven active crews working safety-related cable. Each of the crews observed appeared to be knowledgeable of the prescribed methods of pulling cable and of the limitations imposed by site procedures and good practice. The RRI also examined most of the Main Control Room cabinets and the termination cabinets in the Cable Spread Room of Unit 1 relative to the quality of the workmanship displayed in termination of the cables. No instances were found in which the termination was less than satisfactory as evidenced by the application of the correct size wire lug that was properly crimped and tightly installed on the terminal boards. The RRI also examined a number of terminations for correct connection on the terminals as indicated on the electrical design drawings with no errors being detected. This effort was primarily directed toward the main 6.9 KV switchgear in Safety Train A.

No items of noncompliance or deviations were identified.

9. Protection of Major Safety-Related Equipment

During the course of general plant tours, the RRI noted that the major plant components continue to be well cared for as evidenced by space

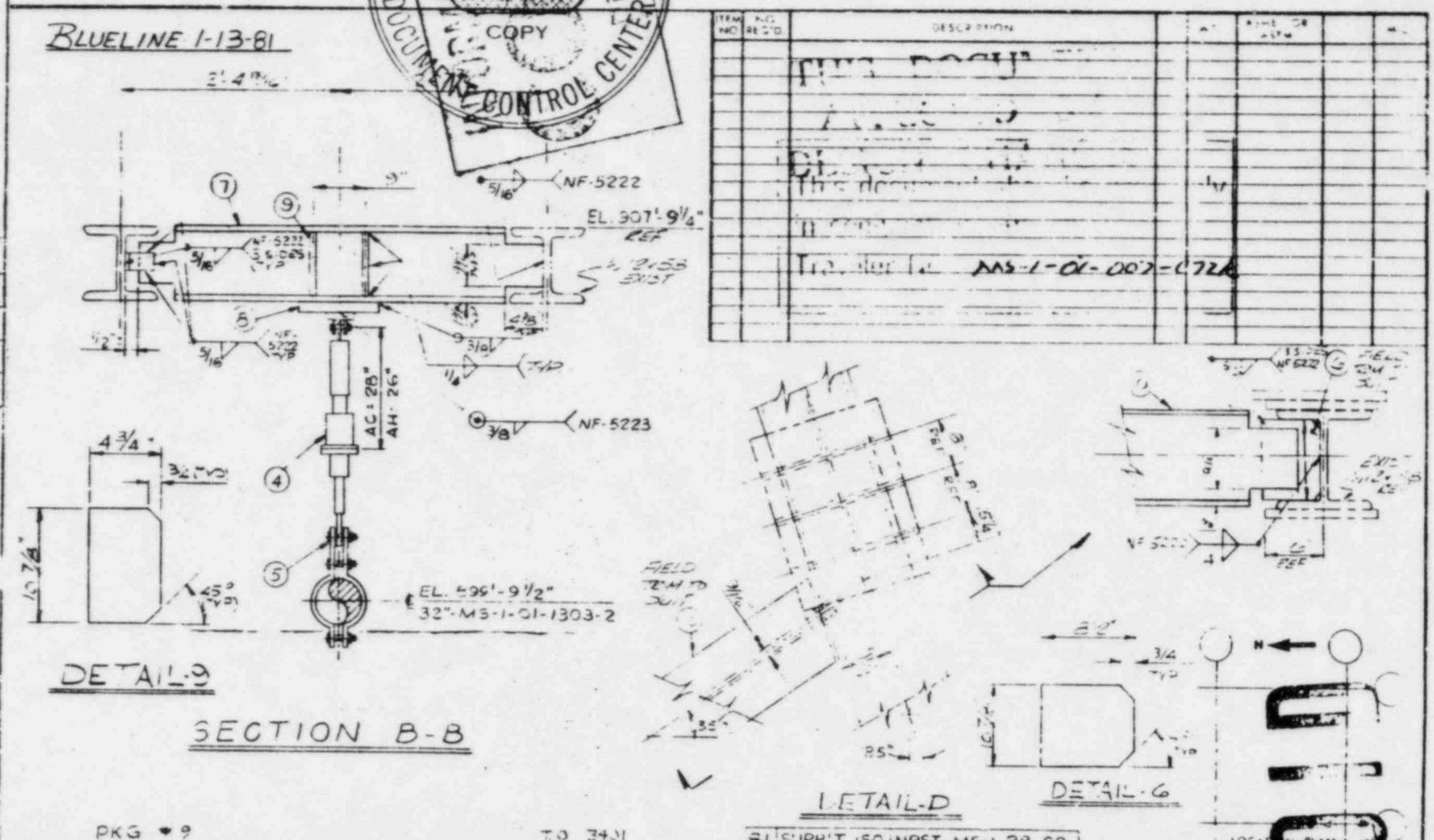
heaters being energized and where appropriate, because of on-going work, the equipment is adequately covered. The Unit 1 and 2 Reactor Vessels were noted to be well protected even though extensive civil construction work was in progress in the immediate vicinity. The Unit 1 Reactor Vessel internals were noted to be in their enclosures and apparently adequately protected as was the Unit 1 Vessel head with the installed Control Rod Drive Mechanisms.

No items of noncompliance or deviations were identified.

10. Management Interviews

The RRI met with one or more of the persons identified in paragraph 1 on April 2, 3, 9, 10, 15, 18, and May 13 and 29, 1980, to discuss inspection findings and to discuss licensee actions and positions.

Category 11 AP13 item 8



PKG #9

TO 3401

81 SUPP'T ISO. INPSI-MS-1-RB-02

REV	DATE	DWN	CHK	APP	DESCRIPTION
0	1-13-81				ISSUED FOR CONST. ... FIELD MODIFIED HANGER SKETCH

REFERENCE DRAWINGS: G & H ISOMETRIC 2323-M; FAB ISOMETRIC; PIPING 2323-M; STRUCTURAL 2323-S; ELECTRICAL 2323-; HVAC 2323-M

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

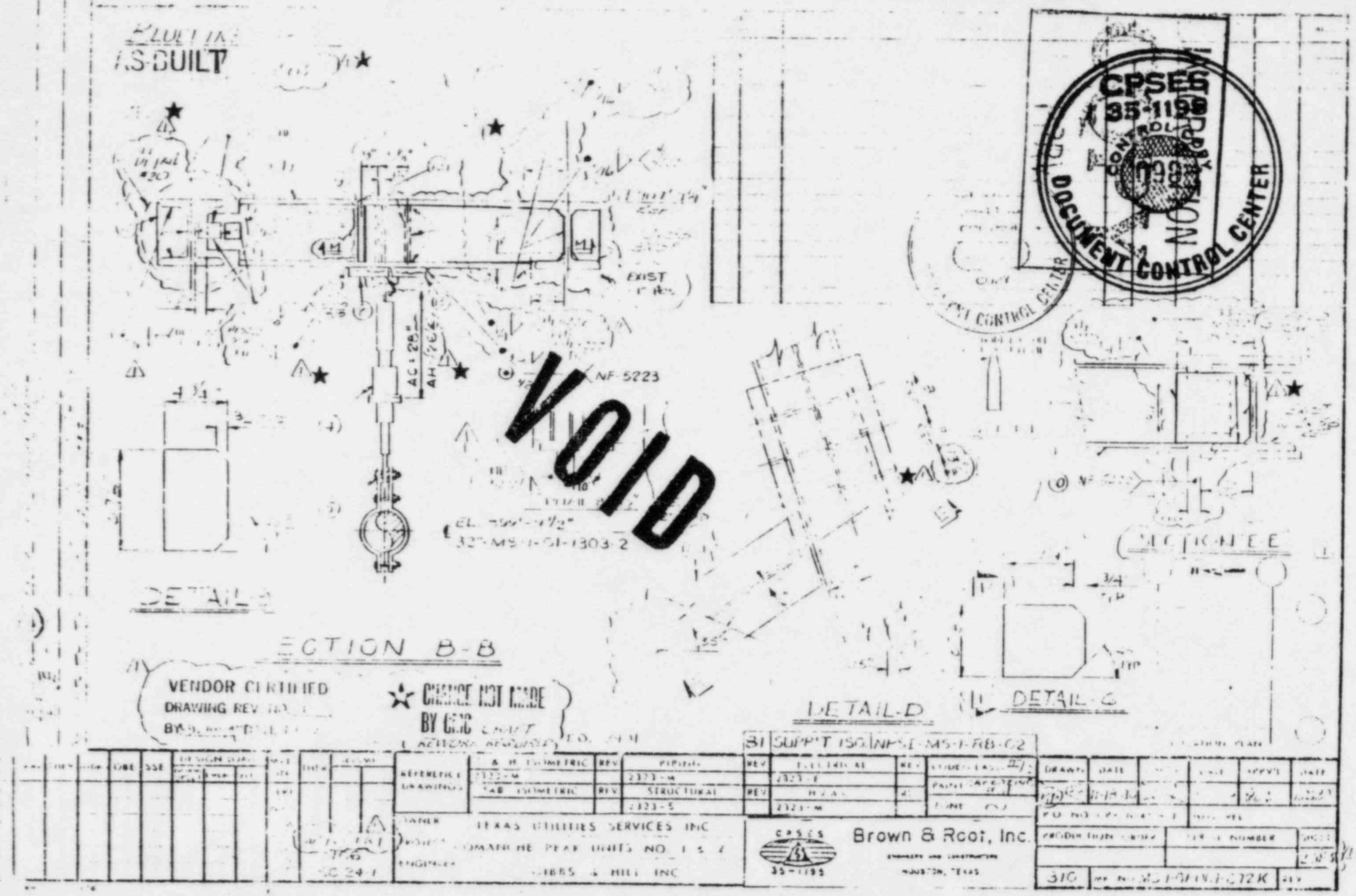
CPSES 35-1195

Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

SER. NUMBER: MS-1-01-007-C72K   SHEET 2 OF 2   REV 0

NM 476

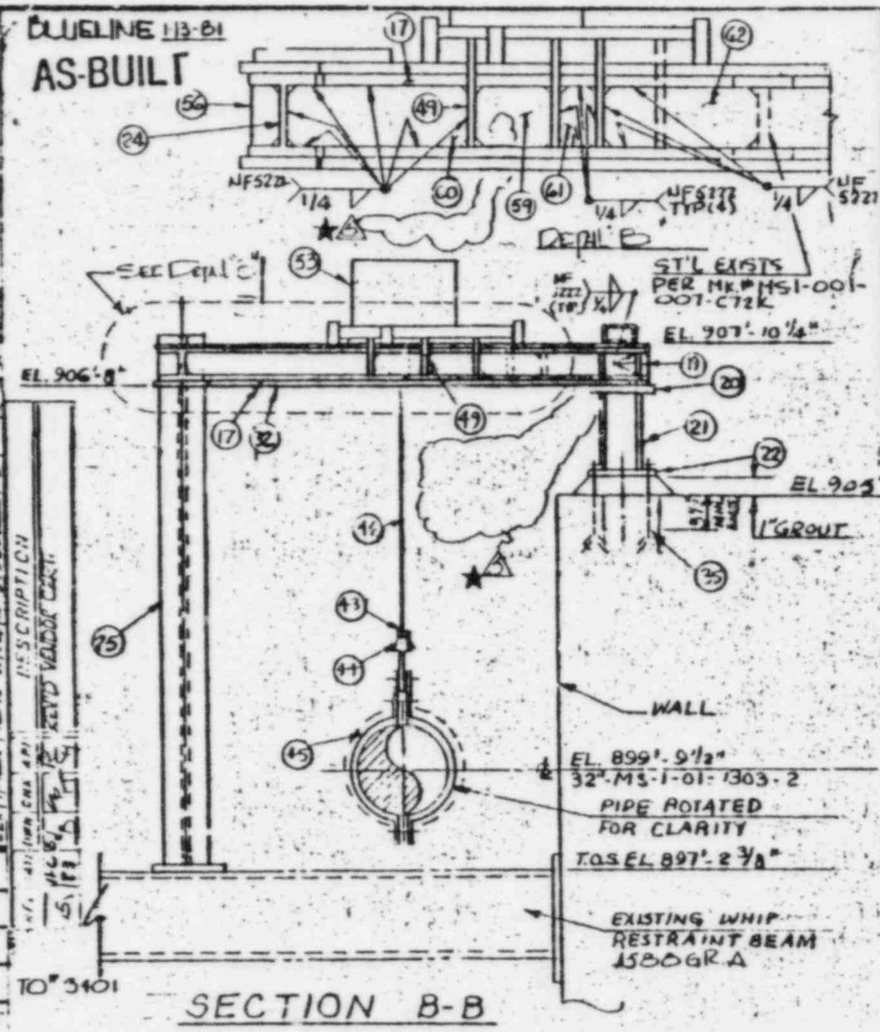
CHECK CURRENT REVISION OF DCA-5021 FOR HANGER CLASSIFICATION.



FOR OFFICE AND ENGINEERING USE ONLY Category II AP 13 Item 37

BLUELINE 1-13-81

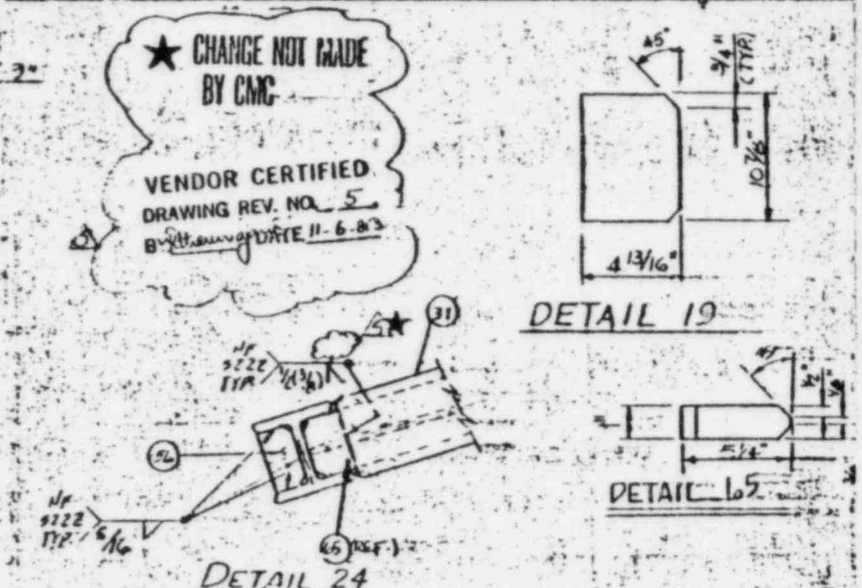
AS-BUILT



ITEM NO	NO REQ'D	DESCRIPTION	WT.	ASME OR ASTM	
16	1	W12 x 58		SA-36	L
17	1	W12 x 58 (FIELD TRIM TO SUIT)		SA-36	L
18	1	FP 1" x 18" x 2'-0" LG.		SA-36	PLS
19	4	FB 4 13/16" x 1/2" x 10 1/8" LG (SEE DETAIL 19)		SA-36	MS
20	2	FP 1" x 14" x 1'-2"		SA-36	MS
21	1	W12 x 58		SA-36	L
22	1	1 1/4" C.S. PL SECT. "0-0"		SA-36	PLS
23	4	1" Ø x 13" SUPER HILTI			
24	1	W12 x 58		SA-36	L
25	1	W12 x 58		SA-36	L
26	1	FP 1" x 17" x 1'-5"		SA-36	MS
27	1	FP 3/4" x 8 1/2" x 2'-1"		SA-36	MS
28	1	W8 x 48		SA-36	L
29	1	FP 3/4" x 10" x 10"		SA-36	PLS
30	2	L 4 x 4 x 3/8" x 8" LG.		SA-36	L
31	2	FP 1" x 12"		SA-36	PLS
32	2	FB 1" x 12" (FIELD TRIM TO SUIT)		SA-36	PLS

★ CHANGE NOT MADE BY CMC

VENDOR CERTIFIED
DRAWING REV. NO. 5
BY [signature] DATE 11-6-83



REV	DATE	DWN	CHK	APP	DESCRIPTION
1	1-13	UF			ISSUED FOR CONST. FIELD MODIFIED / SKETCH & LIFTUP R2
2	7-11				REV. AS (1) (2) ... ADD (13)
3	7-27				REV. VENDOR CERTIFICATION
4					REV'D VENDOR CERT.

B1 SUPP'T ISO. NPSI-MS-1-RB-02

REFERENCE DRAWINGS	ISOMETRIC	REV	PIPING	REV	ELECTRICAL	REV
			2323-M		2323-E	
	FAB. ISOMETRIC	REV	STRUCTURAL	REV	H.V.A.C.	REV
	MS-1-RB-02	B	2323-S		2323-M	

CODE/CLASS: III/2
PAINT: CARBOZINC 11
ZONE: ~

DRAWN	DATE	CHK'D	DATE	APPV'D
JF	5-4-78	JM	5-15-78	MO

P.O. NO. CP-0046 A/1

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

CPSES

Brown & Root, Inc.

SEISMIC: 43 / 001R1, 12C, SC 24-1

137 MK. NO. MS-1-01-001-C72S

MYN

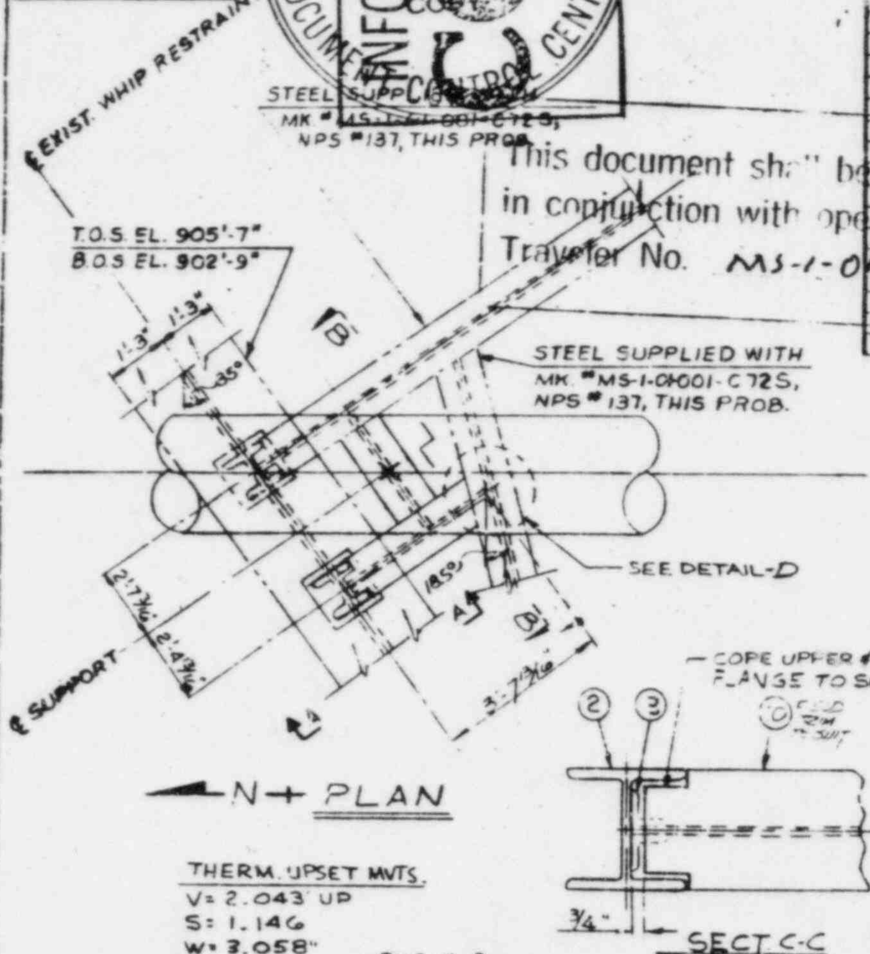
WORK

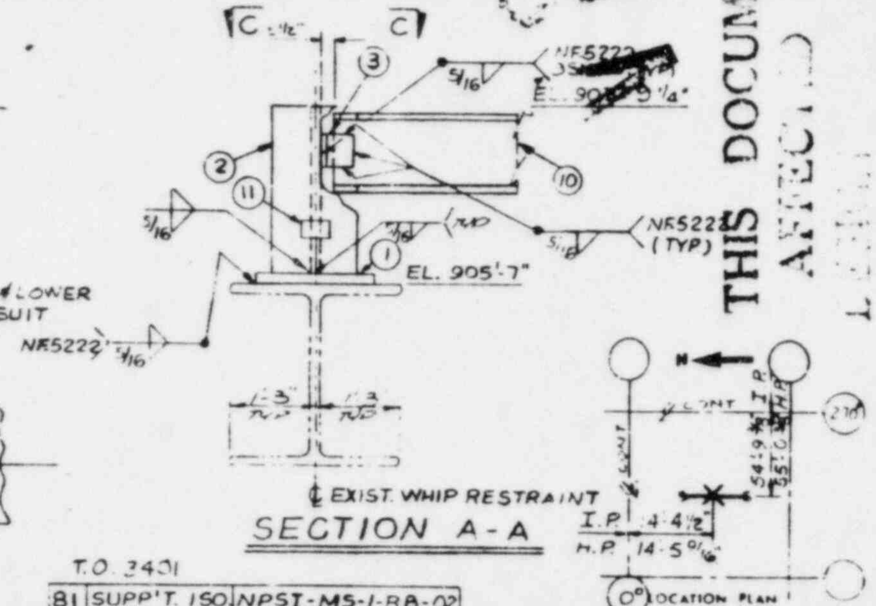
CC 1/5 RB 1 ROOM ELEV

BLUELINE 1-13-81

This document shall be used in conjunction with operation Traveler No. MS-1-01-007-C72K

ITEM NO	NO REQ'D	DESCRIPTION	ASME OR ASTM		
1	1	FP 1" × 14" × 1'-2" LG	SA-36	PLS	
2	1	W12 × 58	SA-36	L	
3	4	L4" × 4" × 3/8" × 8" LG	SA-36	L	
4	1	SMA-35-RC-CC = 50¼" MECHANICAL SNUBBER	—	CSS	
5	1	SPC-24-320 PIPE CLAMP	SA-36	CSS	
6	1	FP ¾" × 10⅞ × 2½" (SEE DETAIL-6)	SA-36	PLS	
7	1	W12 × 58	SA-36	L	
8	1	FP ¾" × 11" × 11" LG.	SA-36	PLS	
9	4	PB 4½" × ½" × 10⅞ LG (SEE DET-9)	SA-36	PLS	
10	1	W12 × 58	SA-36	L	
11	1	ASME III NAME PLATE	~	~	





THIS DOCUMENT AFFECTED BY

Category 11 APR 13 item 9

THERM. UPSET MVTS.
V = 2.043" UP
S: 1.146
W = 3.058"

PKG # 9

T.O. 3401

81 SUPP'T. ISO NPSI-MS-1-RB-02

REFERENCE DRAWINGS	G & H ISOMETRIC	REV	PIPING	REV	ELECTRICAL	REV	CODE/CLASS III/2
	2323-MI-3202-01	G	2323-MI-0500	8	2323-EI-0002	8	PAINT
	FAB. ISOMETRIC	REV	STRUCTURAL	REV	H-A-C	REV	
	MS-1-RB-02	5	2323-SI-0534	2	2323-MI-0552	5	ZONE ~

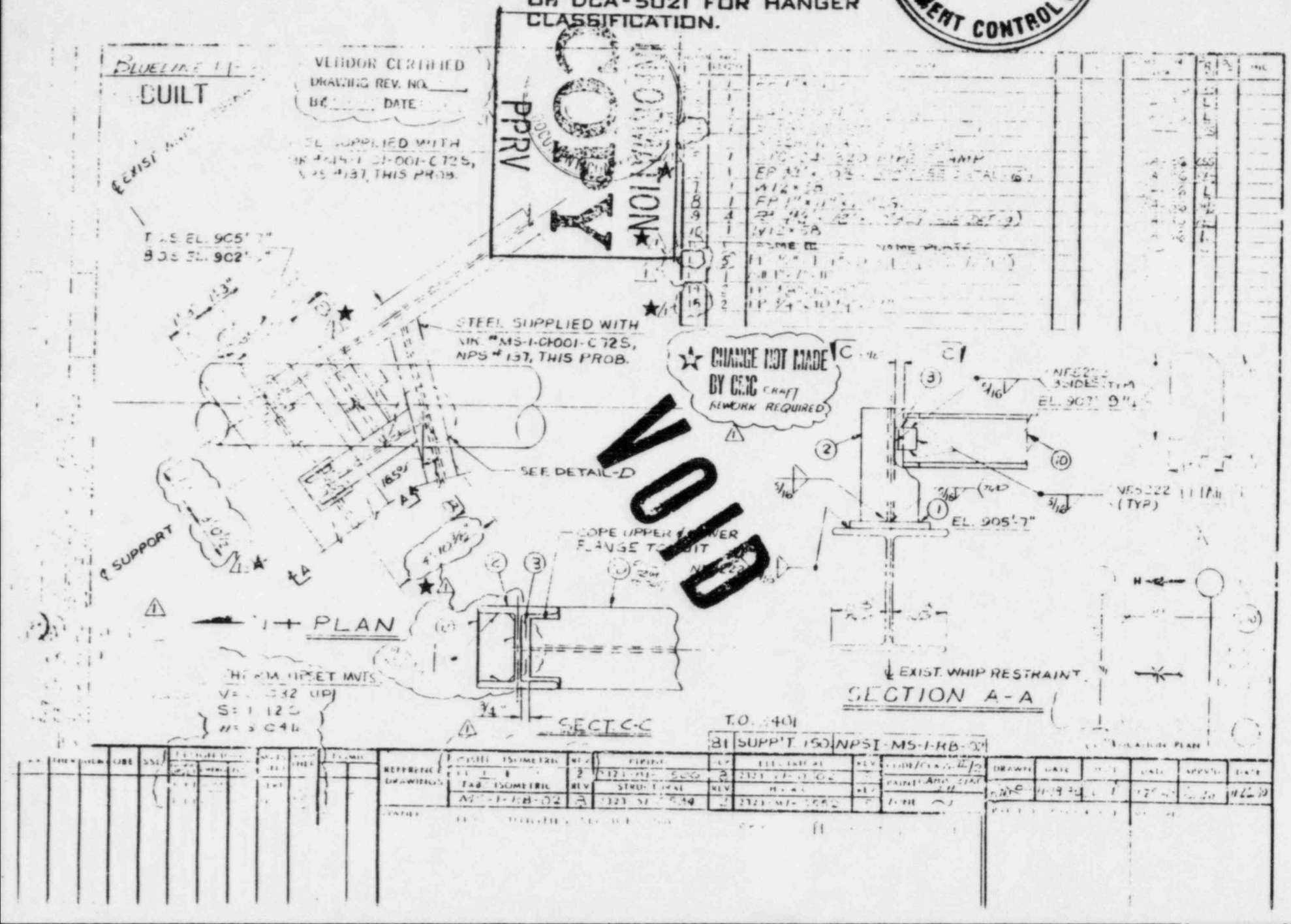
OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

CPSES 35-1195

Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

P.O. NO. 35-0046A.1
DWG NO MS-1-01-007-C72K
310

CHECK CURRENT REVISION OF DCA-5021 FOR HANGER CLASSIFICATION.



TEXAS UTILITIES GENERATING CO CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	CP-QP-19.3	0	MAY 15 1981	1 of 3

SURVEILLANCE
OF PIPING ERECTION

PREPARED BY: [signature] 5-5-81 DATE

APPROVED BY: [signature] 5/15/81 DATE

1.0 REFERENCES

1-A MS-100, "Piping Erection Specification"

1-B CP-QP-16.0, "Nonconformances and Deficiencies"

1-C CP-QP-17.0, "Corrective Action"

2.0 GENERAL

2.1 PURPOSE AND SCOPE

The purpose of this procedure is to describe the methods utilized by Construction Quality Assurance in performance of surveillance to assure that safety related and Seismic Category 1 Piping is being installed within design tolerances as reflected in Reference 1-A and applicable design drawings.

3.0 PROCEDURE

3.1 SELECTION OF SAMPLE SIZE

The TUGCO Quality Assurance Specialist Supervisor shall select a sample of pipe spools from the list of installed spools prepared by the B&R Piping Superintendent.

NOTE: The size of sample and the frequency of the surveillance shall be as directed by the TUGCO Site Quality Assurance Supervisor.

3.2 FIELD VERIFICATION

Field Engineering shall determine actual location of the piping in the sample selected by the Quality Assurance Specialist Supervisor.

The Quality Assurance Specialist shall monitor the activities of the Field Engineering Group and review their records to determine if an out-of-tolerance condition exists.

8511060483

3.3 DOCUMENTATION

Actual location shall be recorded on the marked up flow diagram. In the event that an established bench mark is not used, the number of the Field Engineering Log Book shall be entered on the Piping Erection Surveillance Form, Attachment 1. The Quality Assurance Specialist shall complete Attachment 1 indicating results of the random surveillance. The marked up flow diagram shall be attached to the Piping Erection Surveillance Form and forwarded to the Permanent Plant Records Vault for retention.

3.4 NONCONFORMANCES

Out-of-tolerance conditions shall be reported in accordance with Reference 1-B.

3.5 CORRECTIVE ACTION

The QA Specialist Supervisor shall review the surveillance results and recommend required corrective action per the provisions of Reference 1-C.

ATTACHMENT 1

PIPING ERECTION SURVEILLANCE FORM

DESCRIPTION OF PIPING INSPECTED (LINE NO., PIECE NO(S).) _____

_____

_____

_____

_____

DATE OF SURVEILLANCE _____

DRAWING NO. AND REVISION OF ATTACHED FLOW DIAGRAM(S) _____

_____

DESCRIPTION OF OUT OF TOLEPANCE CONDITIONS _____

_____

_____

_____

_____

_____

_____

_____ _____

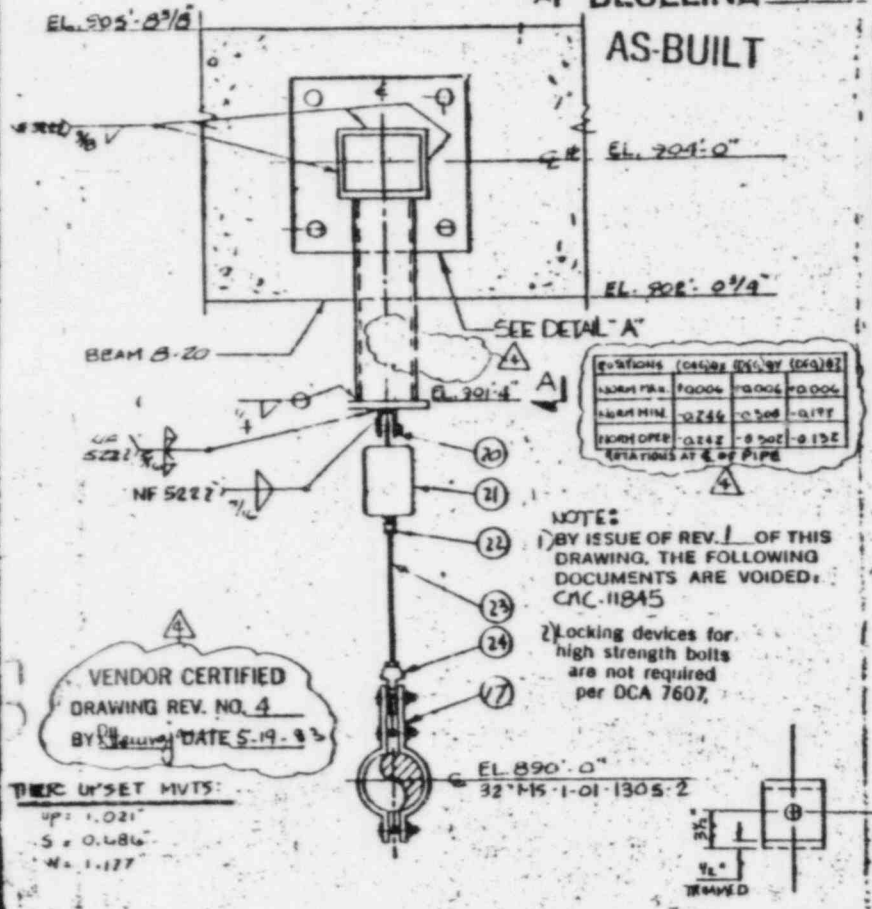
QA SPECIALIST DATE

Category II, AP13, Item 23

FOR OFFICE AND ENGINEERING USE ONLY

A1 BLUELINE - 24 JULY 84

AS-BUILT



POSITIONS	(DEG)X	(DEG)Y	(DEG)Z
MAXIMUM	+0.004	+0.004	+0.004
MINIMUM	-0.244	-0.308	-0.198
WORK OPER	-0.242	-0.302	-0.132

ROTATIONS AT ℄ OF PIPE

NOTE:
1) BY ISSUE OF REV. 1 OF THIS DRAWING, THE FOLLOWING DOCUMENTS ARE VOIDED: CAC-11845
2) Locking devices for high strength bolts are not required per DCA 7607.

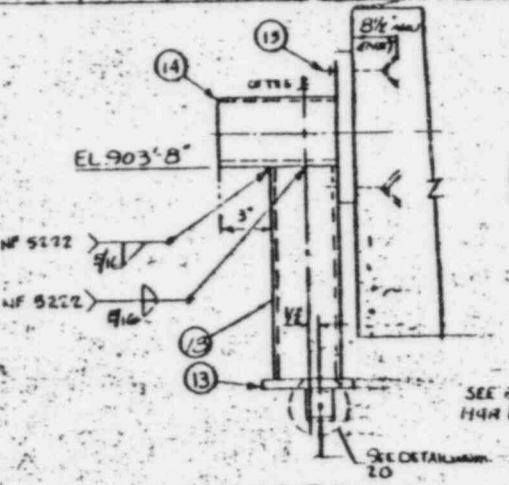
VENDOR CERTIFIED
DRAWING REV. NO. 4
BY [illegible] DATE 5-19-83

THERC UNSET MVTS:
up: 1.021"
S = 0.686"
N = 1.177"

ELEV. LKG SOUTH

DETAIL 20

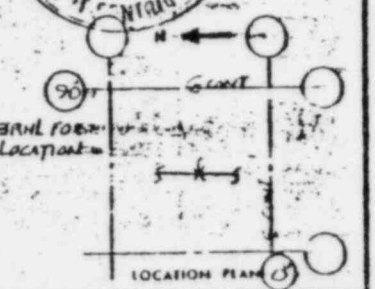
ITEM NO	NO REQ'D	DESCRIPTION	WT	ASME OR ASTM	GR	MC
1	1	BBD-16 WELDED BEAM ATTACH		SA36		
2	1	VLB-10 RIGHT HAND [illegible]				
—	—	VARIABLE SPRING SUPPORT				
3	2	FHN 3/4" HEAVY HEX NUT		A307		
4	1	RCF 10L HANGER ROD [illegible]		SA36		
5	1	REN-10 WELDLESS EYE NUT		[illegible]		
6	1	PFG 300-0264 PIPE CLAMP		SA36		
7	1	FS SA6 x 3/8"		[illegible]		
8	1	FS 8 x 6 x 3/8"		A36		
9	1	WQ x ES		SA36		
10	8	RWP-12 EXCEPT 1" x 2" x 8" STK		SA36		
11	4	RAT-16 A1 3" LG STUDS		[illegible]		
12	8	FHN 1 1/4" Ø HVY HEX NUTS		A307		
13	1	FP 3/4" x 8" 2B"		SA36		
14	1	TS 8 x 8 x 1/2" x 9" LG.		A500 GR B		
15	4	1 1/8" Ø SWGR. PLATE x 13"		H10B4R		
16	1	2" THK SA PER DETAIL "A"		SA36		
17	1	PFG-320-2832 PIPE CLAMP		SA36		
18	1	TS 6 x 6 x 1/2" x 2'-4" LONG		A500 GR B		
19	1	ASME III NAME PLATE/ALL MARKING		—		



SECTION A-A

FIELD REVIEW OF SUPPORT DESIGN AS BUILT CONDITION CPSES - [illegible] DATE 7-19-84 AND 31-52-HU

CPSES
35-1195
CONTROL



REV	DESCRIPTION	DATE	DWN	CHK	APP'D
4	VENDOR CERTIFICATION REF. GTN #0178	11/8			
3	ISSUE FOR CONST EWI-3	4/4			
2	REVISED AS NOTED PER: WP-5187-44	3/27			
1	REVISED NUTS, NOTE 2 PER DCA 7607	5/21			

REV	DESCRIPTION	DATE	CHK	APP'D
4	VENDOR CERTIFICATION REF. GTN #0178	11/8	Q	
3	ISSUE FOR CONST EWI-3	4/4		
2	REVISED AS NOTED PER: WP-5187-44	3/27		
1	REVISED NUTS, NOTE 2 PER DCA 7607	5/21		

LOAD (LBS)	GRAV	THERM	PRESS	OBE	SSE	SEISMIC MOMENTS (IN-KIPS) VESSEL	SEISMIC NOZZLE	SEISMIC FLTG	MVTS (IN.)	OTHER
UP									VERT	
DN						15931			X = S	
N									Z = W	
S									PIPE CLAMP	
W									CONST SUPPT ACC	
E										

SEISMIC: AB-1-001/2.1; 33; SC-4-1

REFERENCE DRAWINGS	BRHL	ISOMETRIC	REV
	MS-1-RB-02		2
	FAB. ISOMETRIC		REV
	MS-1-RB-02		8

PIPING	
1333-MI-2506	8
STRUCTURAL	REV
1333-S1-0516	2

ELECTRICAL	
3333-E1-0[illegible]	8
HVAC	REV
3333-M1-552	5

SUPPT SO	
31	

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO: 1 & 2
ENGINEER: GIBBS & HILL INC.

CPSES 35-1195 — Brown & Root, Inc

MPSE: MS-1-RB-01	
CODE/CLASS: III/1	
PAINT: [illegible]	
ZONE: —	

DRAWN	DATE	CHK'D	DATE	APP'D	DATE
RB DN	5/3/78	[illegible]	5/5/78	[illegible]	5/6/78

P.O. NO. CP-00[illegible] MFG. REF.

PRODUCTION ORDER	SERIAL NUMBER	SHEET
		1 OF 2

138 MK. NO MS 1001-002-C725 REV. 4

08 MW

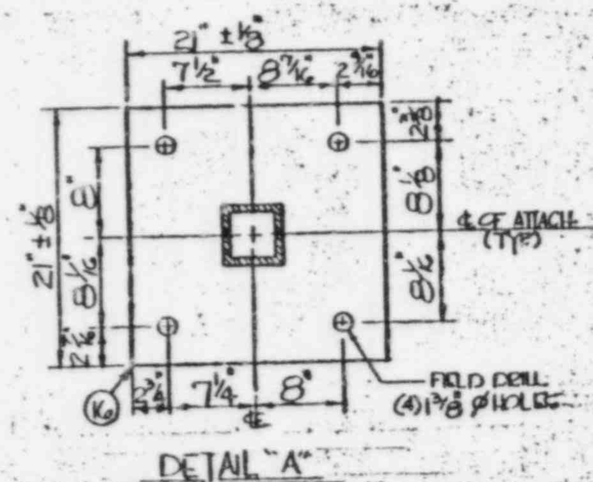
FOR OFFICE AND ENGINEERING USE ONLY

Category II AP 13 Item 17

BLUELINE — 24 JULY 81

AS-BUILT

ITEM NO	NO REQ'D	DESCRIPTION	WT.	ASME OR ASTM	P R M	MIC.
20	1	BBD-18 WELDED BEAM ATTACH.		SA-36	CSS	
21	1	VLB-19 THOO HU#16489* CL=19253*			CSS	
		TVL-Q.97"UP (COMPONENT WEIGHT OF 557#				
		INCLUDED IN HL) VARIABLE SPRING				
22	2	FHH-18 HEAVY HEX UNITS		SA-307	CSS	
23	1	RST-20 R1=13" R2=8" L=5'-0"		SA-36	CSS	
		SHOP TURN (THREAD ENDS TO 2'4"?)				
24	1	REH-18 WELDLESS EYENUT		A668GRC	CSS	

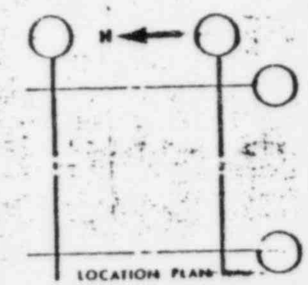


DETAIL "A"

VENDOR CERTIFIED DRAWING REV. NO. 4 BY [signature] DATE 5-19-83

TO/3401

CPSES 35-1195 CONTROL COPY DOCUMENT CONTROL CENTER



LOCATION PLAN

REV	DATE	DWN	CHK	APP	DESCRIPTION
4	5-19-83				ISSUE FOR CONST. REF. UPSI K-2-C; FHH-3 (SEE NOTE); REV'D AS LTD. REF. CMC 51020 Rev 6; DCA 20,104 Rev. 1; AS-BUILT; VENDOR CERTIFICATION REV. 4 TNF 81718
0					REV'D VENDOR CERTIFIED REF. ISTU # 69500

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

REFERENCE DRAWINGS: ISOMETRIC; PAT. ISOMETRIC; PIPING 2323-M; STRUCTURAL 2323-S; ELECTRICAL 2323-E; H.V.A.C. 2323-M; CODE/CLASS: III/2; PAINT; ZONE

LINE: 4B-1-001 R1; 35; SC-24-1

Brown & Root, Inc. HOUSTON, TEXAS

P.O. NO. CP-0046A-1
PRODUCTION ORDER
SHEET 2 of 2
138 MK. NO MS-1-001-002-C72S REV. 4

NPS FORM 103 2/78

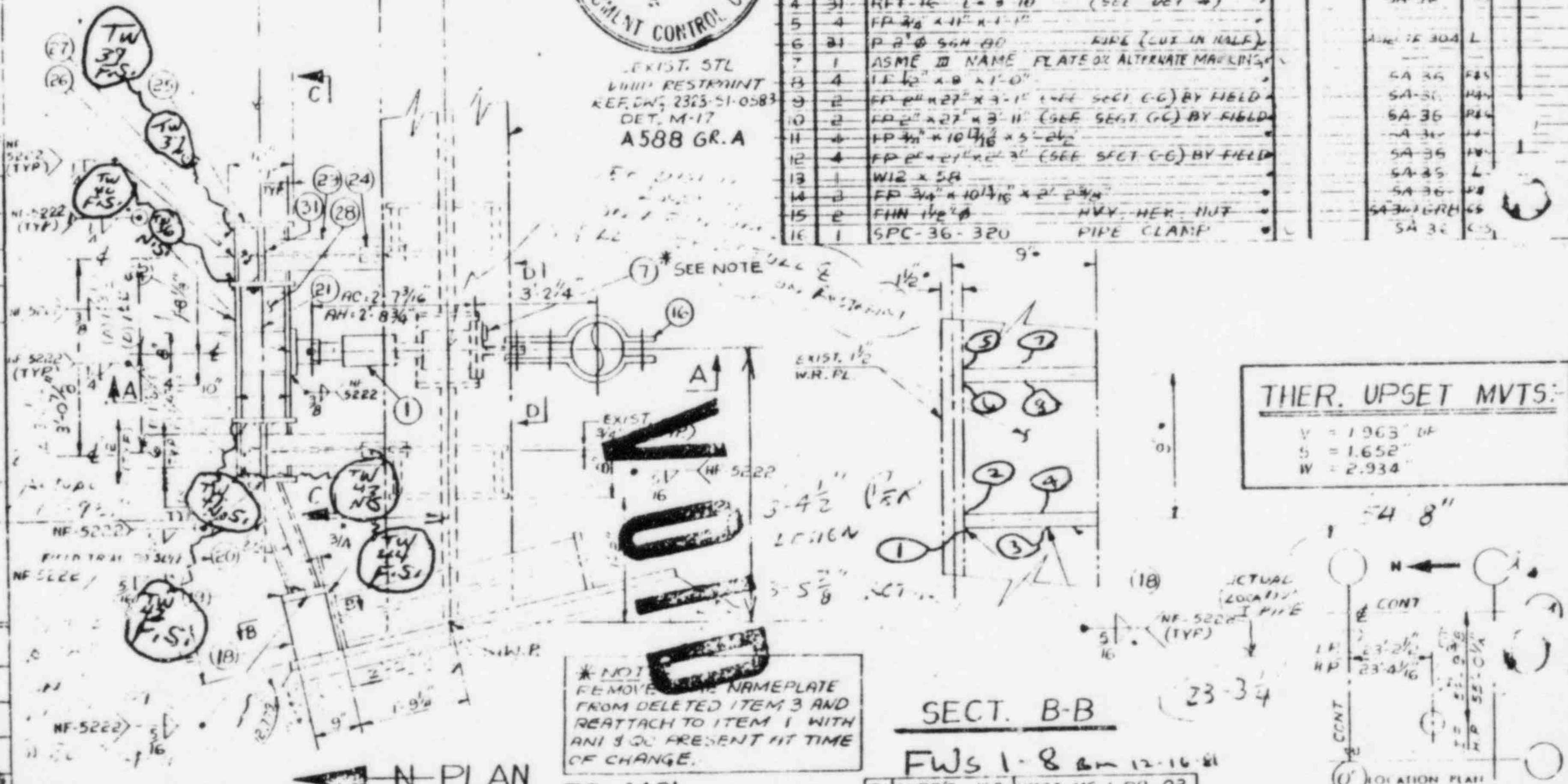
M481

BLUELINE

INFORMATION COPY

DOCUMENT CONTROL CENTER

ITEM NO	NO REQ'D	DESCRIPTION		ASME OR ASTM	
1	1	SMF-100 SO CC = 3'-3 3/16" L = 8 3/4" MECH SNUBBER			
2	2	W12 x 58		SA-36	L
3	2	W12 x 58		SA-36	L
4	31	RFT-16 L = 3'-10" (SEE DET 4)		SA-36	
5	4	FP 3/4" x 11" x 1'-1"			
6	31	P 2" Ø SCH 80 PIPE (CUT IN HALF)		A312 TP304	L
7	1	ASME III NAME PLATE OR ALTERNATE MARKING			
8	4	LE 1/2" x 8 x 1'-0"		SA-36	
9	2	FP 2" x 27" x 3'-1" (SEE SECT C-C) BY FIELD		SA-36	
10	2	FP 2" x 27" x 3'-11" (SEE SECT C-C) BY FIELD		SA-36	
11	4	FP 3/4" x 10 13/16" x 5'-2 1/2"		SA-36	
12	4	FP 2" x 27" x 2'-3" (SEE SECT C-C) BY FIELD		SA-36	
13	1	W12 x 58		SA-36	L
14	1	FP 3/4" x 10 13/16" x 2'-2 3/4"		SA-36	
15	2	FHN 1 1/2" Ø HVY. HEX. NUT		SA-194 GR. H	
16	1	SPC-36-320 PIPE CLAMP		SA-36	



★ NOTE: REMOVE NAMEPLATE FROM DELETED ITEM 3 AND REATTACH TO ITEM 1 WITH ANI & QC PRESENT AT TIME OF CHANGE.

N PLAN

T.O. 3401

B1 SUPP'T ISO. NPSI-MS-1-RB-02

REFERENCE DRAWINGS	G & H ISOMETRIC	REV	PIPING	REV	ELECTRICAL	REV
	2323-MI-3202 01	6	MI-0586	8	E1-0502	9
	FAB ISOMETRIC	REV	STRUCTURAL	REV	H.V.A.C.	REV
	MS-1-RB-02	8	2323-SI-0532	2	2323-MI-0552	5

DRAWN	DATE	CHK'D	DATE	APP'D	DATE
BS	12-1-80	DF	12-4-80		12-10-80

OWNER: TEXAS UTILITIES SERVICES INC.

PROJECT: COMANCHE PEAK UNITS NO. 1 & 2

Brown & Root, Inc. ENGINEERS AND CONSTRUCTORS HOUSTON, TEXAS

P.O. NO. CP-0046A.1

SHEET 1 OF 5

MS-1-001-006-C72K REV 1

Category II AP13 item 10

Category 11 AP13, item 11

SECTION 7

CONTENTS

7.0 SUPPORTS AND RESTRAINTS

7.1 GENERAL

7.1.1(Q)

For piping systems of ASME Section III Class 1, Class 2, and Class 3, the Contractor shall provide all labor, supervision, utilities, tools, and equipment required for the erection and adjustment of all supports and seismic restraints. The Work shall be done in accordance with requirements of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NF - Component Supports. Installation of supports and seismic restraints shall be done in accordance with manufacturer's assembly and installation drawings. | 6

7.1.2

For non-nuclear and Class 5 piping systems, installation of supports, guides, restraints and anchors shall be in accordance with manufacturer's installation drawings, ANSI B31.1 or B31.3, as applicable, and this specification. | 6

7.1.3

Contractor shall coordinate with the Work the checking of physical clearances of all hangers, and seismic restraints against piping, ventilation, structure, and equipment drawings. Any interferences found shall be immediately reported to the Owner before continuing with the installation.

7.1.4

Although the design of the hangers and seismic restraints is by others (except as provided in subsection 7.6), the Contractor shall be responsible for checking the hanger assembly and installation drawings and completed installation to assure compliance with this section. Where the word "hanger" is used, the provisions shall also apply to seismic restraints, and fixed point restraints.

7.1.5

The Contractor shall install all steel necessary for the proper support of all piping systems as detailed by pipe support assembly and installation drawings. For safety related systems, installation shall be in accordance with the requirements of ASME Section III, Subsection NF. For non-safety related systems, installation shall be in accordance with AWS or AISC standards, as applicable.

6

7.1.6

Deleted.

7.1.7

No temporary attachments to the building steel for rigging of hangers, hanger steel, or piping will be permitted to the extent that the attachments may impose torsional moments on beams or columns or bending moments on columns. Contractor shall, where damage to structural steel is possible, submit his erection procedure for Engineer's approval prior to rigging Work.

7.1.8 (Q)

Seismic restraints including snubbers shall be installed as shown on drawings and according to supplier's instruction. The snubber assembly shall be installed at its cold position in the compression or tension mode as shown on supplier's drawings.

7.1.9

It is the intent of this specification that the Contractor install, to the maximum degree practical, all hangers and supports prior to installing pipe in order to speed up the erection work.

7.1.10

The surfaces of brackets, clamps, etc., in direct contact with austenitic stainless steel piping with an operating temperature of 650 F or greater shall be separated by stainless steel shims supplied by the hanger suppliers. Carbon steel materials may be used to temporarily support austenitic stainless steel piping during construction. Care shall be taken to assure that the

arrangement of the temporary carbon steel hangers does not result in carbon steel particles becoming embedded in the surface of the stainless steel pipe.

7.1.11

Copper inserts shall be installed between the hanger and copper pipe to avoid direct contact of copper pipe with the steel or iron hanger.

7.1.12

Pipe supports for Class 5 piping which are designated Non-Nuclear safety-Seismic Category II shall be installed in a construction system which provides the controls listed in Appendix 8 to assure quality. As used in this paragraph, "Installation" is an all inclusive term that includes not only installation but also revisions or replacements of materials to a pipe support supplied by offsite vendors as well as any support totally fabricated at the CPSES site by the contractor. Class 5 piping may be seismically hung to prevent damage to nuclear safety related piping systems. 6

7.2 WELDING

7.2.1 (Q)

Installation of hangers, supports, and seismic restraints, shall meet the requirements of subsection NF of Section III, ASME Code.

7.2.2

Attachment welds to structural steel members shall be made with the longitudinal axis of the structural member. Where the design requires additional welds to be made with the transverse axis of the structural member, the weld shall be deposited with open ends or as shown on drawings.

7.2.3

Welding of permanent hanger steel or attachments to the building steel that is not strictly in accordance with approved hanger details will be permitted only upon receipt of written approval from the responsible field engineer. Temporary hanger steel or attachments may be welded to the building steel provided the guidelines of Section 7.2.2 are met; deviations must be approved 6

by the Owner. Weld leg sizes and lengths shall be construed as the minimum acceptable amount of weld. Additional welding is acceptable provided the leg size is not in excess of twice that shown on the manufacturer's drawing, and that the guidelines of paragraph 7.2.2 are met.

7.2.4

All welding of supports designated Class 1, 2, or 3, including any attachment welds to bulding steel shall be in accordance with ASME Section III, Subsection NF. All welding of supports designated to support other than ASME piping, shall be in accordance with the requirements of AWS D1.1.

a) Welding of lugs on ASME Section III piping or any other welding to ASME Section III piping shall be in accordance with Subsection NB, NC or ND, as applicable. The part welded to the piping, even if shown on the pipe support detail sketch, is not NF.

b) Similar to a) above welding on ANSI B31.1 or B31.3 piping shall be in accordance with the respective standard.

c) Attachments to carbon steel piping shall be of the same P-number grouping as the piping.

d) Attachments shall not be welded directly to austenitic stainless steel piping materials, unless otherwise shown on the pipe support design drawings.

6

7.2.5

Attention is called to the requirement in Subsection NF 4000 of Section III, ASME Code for inspection of NF welds by the authorized inspector. These welds will be identified on hanger drawings, and the Contractor shall prepare the necessary data, in cooperation with the Owner, to effect this inspection.

7.2.6 (Q)

Inspection of welds shall be in accordance with the following table:

N.D.E REQUIREMENTS FOR WELDING COMPONENT SUPPORTS

1. Plate and Shell Type Support Welds

A.

	Class I NF-5211		
	RT & UT	MT or PT	Visual
Full Penetration Butt Welds	X(note 1)	X(note 2)	
Full Penetration Groove Welds	X(note 1)	X(note 2)	
Double Fillet Welded Lap Joints	X(note 1)	X(note 2)	
Full Fillet Welded Tee Joints	X(note 1)	X(note 2)	
Other Welds in Primary Members		X(note 2)	
All Other Welds			X

B.

	Class II & MC NF-5221	
	MT or PT	Visual
Full Penetration Butt Welds	X(note 3)	
Full Penetration Groove Welds	X(note 3)	
Double Fillet Welded Lap Joints	X(note 3)	
Full Fillet Welded Tee Joints	X(note 3)	
Other Welds in Primary Members	X	
All Other Welds		X

C.

	Class III NF-5231	
	MT or PT	Visual
Full Penetration Butt Welds	X(>1-1/2"t)	X
Full Penetration Groove Welds		X
Double Fillet Welded Tee Joints		X
Full Fillet Welded Tee Joints		X
Other Welds in Primary Members		X
All Other Welds		X

6

2. Linear Type Support Welds

A.

	Class I NF-5212		
	RT & UT	MT or PT	Visual
Full Penetration Butt Welds	X(note 1)	X(note 2)	
Full Penetration Tee Welds and corner joints	X(note 1)	X(note 2)	
All Fillet Welds	X(note 1)	X(note 2)	
All Other Welds			X

B.

	Class II & MC NF-5222; Class III NF-5232	
	MT or PT	Visual
Full Penetration Butt Welds		X
Full Penetration Tee Welds		X
All Fillet Welds		X
All Other Welds		X

3. Component Standard Support Welds

A.

	Class I NF-5213		
	RT	MT or PT	Visual
Full Penetration Butt	X		
Fillet Welds with Throat Dim >1 in.		X	X
All Other Welds			X

B.

	Class II & MC NF-5223; Class III NF-5233	
	MT or PT	Visual
Full Penetration Butt		X
Fillet Welds with Throat Dim >1 in.		X
All Other Welds		X

Note 1

When the results of Radiography are not meaningful, Ultrasonic examination shall be performed. In addition, the adjacent base material for at least 1/2 inch on each side of the joint shall be examined by either MT or PT.

Note 2

When the requirements of note 1 can not be met, the welds including the adjacent base material for at least 1/2 inch on each side of the weld shall be examined by either MT or PT.

Note 3

In addition, the adjacent base metal for at least 1/2 inch on each side of the joint shall be included in the examination.

7.2.7

Inspection of non-safety related system welds shall be in accordance with ANSI B31.1 or B31.3. Fire protection system piping supports shall also meet NFPA requirements.

7.2.8

Permanent attachments may be welded to non-lined piping after the pressure test is performed provided the requirements of ASME Sec. III, Article NB-4436 1977 Edition, are met.

7.2.9

Attachments may be welded to pipe containing non-volatile fluids provided the following conditions are met:

1. Stainless Steel

   A. Attachments and pipe are of compatible material.

   B. The throat thickness of the attachment fillet weld shall not exceed the pipe wall.

   C. The maximum heat input shall be the maximum allowed for a 5/32" electrode.

   D. All welds and adjacent pipe base metal up to 1/4" from the toe of the weld shall be penetrant tested.

6

2. Carbon Steel

   A. Actachments and pipe are of compatible material.

   B. The throat thickness of the attachment fillet weld shall not exceed the pipe wall.

   C. The base metal shall be 0.30% carbon or less.

   D. The maximum heat input shall be the maximum allowed for a 5/32" electrode.

   E. The base metal shall be pre-heated to 200°F.

   F. All welds and adjacent pipe base metal up to 1/4" from the toe of the weld shall be penetrant or magnetic particle tested.

   G. If the SMAW processes is used the minimum electrode diameter shall be 5/32".

7.3 TOLERANCES

With respect to drawing locations, hangers shall be erected within the following permissive tolerance ranges unless the Owner directs otherwise:

a. For dead weight supports - plus or minus twelve inches axially, and plumbness plus or minus 2 degrees.

b. For seismic restraints

   i. Seismic restraints, anchors, guides, etc. may be located plus or minus 2 x pipe wall + 2 inches from its theoretical position.

   ii. For attachments to center of structural steel reaction members - plus or minus two inches, and plumbness plus or minus 2 degrees.

c. For box frame type supports

   i. Where the design shows 1/16" on both sides, the total dimensional tolerance shall be 1/8" ± 1/16" (e.g., 0" on

one side w/1/8" ± 1/16" on the other, 1/16" ± 1/32" on both sides, or any combination).

ii. Where the design shows 0" on one side and 1/16" on the other side, 0" must be maintained while 1/16" ± 1/32" is required on the other side. 6

iii. For low energy lines, if the clearances in i and ii cannot be maintained due to ambient thermal expansion, a total clearance of 1/8" ± 1/16" on any two adjacent sides is acceptable.

In the use of these deviation values, when more than one direction plane is involved, the resultant value shall not exceed the deviation value.

7.4 ADJUSTMENT OF HANGERS

7.4.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.4.2 Adjustment Prior to Testing and Flushing

Prior to hydrostatic testing, the Contractor shall inspect all installed permanent hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, freedom of rods to swing and guidelines to permit movement without binding, and adequacy of all anchors. 6

All threaded components shall be inspected to assure full thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. If the permanent hangers are not available for installation, the contractor shall be responsible for providing adequate temporary support during the test. Hanger installation and adjustment requirements for testing are as follows:

a. Flushing and Hydro-Testing of Steam Lines

i. For steam as the blowout medium at normal operating temperature or less, the deadweight supports (spring and rigid hangers) are required to be in place with all spring hangers in the unlocked and cold set positions. Thermal restraints (rigid and guide) and moment restraint supporting structures are required to be in place.

ii. For demineralized water as the flushing or test medium at ambient temperature, the deadweight supports are required to be in place with all spring hangers in the locked position. The moment restraint supporting structure is not required if it is substituted by a temporary rigid support.

iii. For air as the blowout medium at ambient temperature, the deadweight supports (spring hangers and rigids) are required to be in place with all spring hangers in the unlocked position. The moment restraint supporting structure is not necessary if substituted by a rigid support.

b. Pneumatic Testing and Blowout of Air and Gas Lines

Air and gas lines shall be pneumatically tested and blown out with clean dry air only. This is to be done at or near ambient temperature. The deadweight supports (spring hangers and rigids) are required to be in place. The moment restraint supporting structure is not required if it is substituted by a temporary rigid support.

c. Flushing and Hydro-Testing of Water Lines

For air or demineralized water as the medium at or near ambient temperature, the deadweight supports are required to be in place with all spring hangers in the unlocked and cold set position. The moment restraint supporting structure is not required if it is substituted by a temporary rigid deadweight support.

7.4.3 Hanger Adjustment for Pipe System Operation

7.4.3.1

The Owner's procedure on removal of hanger travel stops, hanger adjustments for the design cold load, and other steps to place completed systems into operation shall be followed by the Contractor as directed by the Owner. The Work requirement of this specification covers up to the accepted pipe hydrostatic tests. The subsequent application of insulation and finish painting or coating shall be performed by the Contractor according to separate specifications.

7.4.3.2

All temporary attachments and devices used in installing the Work shall be removed from the work areas prior to pipe system turnover to the Owner.

7.5 TEMPORARY HANGERS

To minimize risk of personnel injury or equipment damage, all piping shall be erected in its permanent hangers. If permanent hangers are not installed, temporary hangers may be used. Piping may be temporarily supported from other piping provided that the contractor takes adequate precautions to assure that the supporting piping is not damaged. Piping shall not be supported from valves or equipment. 16

7.6 SUPPORT GUIDELINES FOR PLUMBING

7.6.1

Plumbing hanger Work by the Contractor shall be as shown on drawings and as described in this Section. Seismic supports will be supplied by others and erected by the Contractor in accordance with supplier's instruction.

7.6.2

For permanent hanger installation, the Contractor shall use available, existing embedded inserts or plates or, if not available, core drilled anchor bolts, plates, or similar devices for hanger attachments as shown on drawings. Unless shown otherwise on drawings, attachments to concrete surfaces shall be

Richmond screw anchors, Hilti Kwik Bolts, or Engineer approved equal. No cinch anchors shall be used for seismic category piping without prior approval of the Owner.

7.6.3

Hanger attachments shall be accurately located wth relation to building column center lines, equipment locations, and the necessary hanger offset indicated on the drawings, when applicable. In all instances where equipment location or attachment steel deviates from the design tolerances, the Contractor shall notify the Owner and take all necessary measurements to determine the proper attachment location. Attachments for sliding supports, anchor bases, and floor stands shall be accurately shimmed and leveled to a true plane surface. Where attachments are anchored to masonry floors or walls, the attachment plate shall be firmly grouted within 1/8 inch to 12 inch tolerance (i.e., 1/8 inch vertical maximum deviation in 12 inch horizontal length).

7.6.4

(DELETED)

7.6.5

(DELETED)

7.6.6

Unless shown otherwise on drawings, horizontal runs of pipe shall be hung from heavy adjustable wrought iron or malleable iron pipe hangers spaced as shown on the following table:

Pipe Size (Inches)	Max. Pipe Support Spacing (Feet)
3/4	7
1	7
1-1/2	7
2	10
2-1/2	10
3	12
4	14
6	17
8	19
10	19
12	23

7.6.7

Unless shown otherwise on drawings, vertical runs of pipe shall be supported with heavy wrought iron clamps or collars. Supports shall be spaced on a maximum of 20 feet.

7.6.8

Chain, strap, perforated box, or wire hangers will not be permitted. Trapeze hangers will be permitted in lieu of separate hangers. All hangers supporting pipe of different services running near each other shall be in line and parallel as near as possible. Any plumbing pipe shall, wherever possible, be installed parallel or at right angles to the structure to provide a neat-appearing installation.

Brown & Root, Inc.

P.O. BOX 1001 GLEN ROSE, TEXAS 76043

MESSAGE	REPLY
To Weld Eng.	DATE
DATE 4-21-82	
Request temp data cards for following	
MS-1-RB-001 @ FW-5	
MS-1-RB-002 @ FW-5	
MS-1-RB-004 @ FW-5	
32" Butt weld at clock positions 12-3-6-9	
Material is P-1 type on all spools.	
BY Dave Hullum	SIGNED

DETACH AND FILE FOR FOLLOW-UP

Category II AP13, Item 2

3843